

# SFMTA Consultant Contracting Procedures

- Compliance with FTA circular 4220.1E
- Agency self certification
- FTA contract clause and provision compliance
- Procurement training
- Written standards of conflict



# SFMTA Consultant Procurements

- Qualifications-based competitive proposal
  - Evaluation of qualifications
  - Price excluded as an evaluation factor
  - Negotiations with the most qualified.
  - Contract Award made to most qualified whose price is fair and reasonable.



# SFMTA Consultant Procurements

- Cost or price analysis
  - Independent estimate prior to proposal.
  - Labor hours, overhead, materials cost analysis
  - Profit negotiation
  - Prohibition of cost plus percentage of cost.
- Payment provisions
  - No advance payments.
  - Monthly progress payments



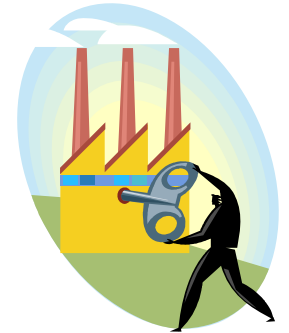
# SFMTA Consultant Procurements

- Staff augmentation to maintain a stable, efficient technical staff
  - Civil Service Commission Classification
- Consultant selection process report
- Establishment of DBE goals



# Consultant Selection Procedure

- Evaluation criteria/selection
- Professional liability
- Fixed fee not to exceed 10%
- Commitment of key personnel
- Standardized invoicing



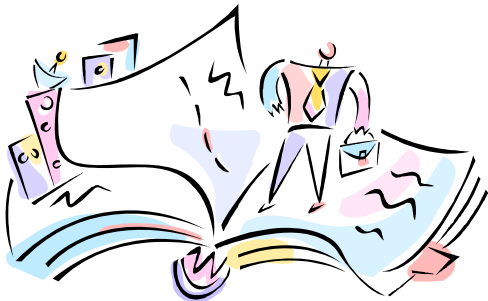
# Consultant Administration

- Goal of effective business relationship
  - Ensuring close supervision of budget, schedule, technical performance and compliance with documentation requirements
- Assign responsibility to agency PM



# Consultant Management

- Approving resourced task based work plan
- Billing verification
- Monitor consultant's conformance work.
- Initiate design process reviews
- Small business enterprise monitoring



# Consultant Relationship Goals

- Time is money
- Order taker / loss of value
- Pay for services performed
- Design integration
  - Fragmented delivery process
  - Liability insulation
- Use embedded math & science logic into software. Embedded technology
- Knowledge sharing





# Building and Sustaining Project Team

- Project Team Building
  - Work breakdown structure
  - Regulatory interface plan
  - Third-party stakeholder endorsement
  - Well defined goals
  - Clear responsibilities
  - Boundary/operating guidelines
  - Decision making process



# Building and Sustaining Project Team

- Sustaining the Team
  - Measure progress
  - Diagnosis
  - Evaluation and feedback
  - Corrective action
- Closing the Project
  - Phased closure of tasks
  - Archive Information
  - Demobilize Staff
  - Reward and Recognition



# Consultant Amendments



- Amendment Request
  - Description of scope change
  - Engineer's cost and schedule impact
  - Evaluation of in-house technical resources
- Consultant Amendment proposal
  - Task definition
  - Direct labor impacts
  - Profit
  - Small business enterprise goals
  - Negotiation of both time and cost

# Conflict Resolution/Change Management

- Avoid placing blame
- Clarify and define issue
- Listen completely to other party
- State your point of view clearly
- Work on what you can agree on
- Brainstorm alternate solutions
- Attempt to agree on a potential solution
- Document solution
- Agree on how to check if solution is working





**METRO**



# **Building Information Modeling (BIM)**

## **Application in Utility Design**

**Brian D. Buchanan - Dir. Design and Construction**  
**METRO**



# What is BIM?

- Building Information Modeling
- Using Virtual Design for project collaboration from design through construction
- Most Widely used in Vertical Construction
- Moving into Horizontal Construction



# BIM EXTREME

- 3D Geometry of all major existing and proposed components including shape, size, and X,Y,Z coordinates
- 4<sup>th</sup> Dimension – Each component tied to Construction Schedule
- 5<sup>th</sup> Dimension – Each component tied to Construction Cost Estimate





# Traditional Design & Construction Process

- Designer imagines an idea to solve a clients program
- Designer deconstructs 3D ideas to 2D representations
- Designer passes 2D representations to construction team
- Construction team attempts to reassemble the information into 3D object

Steve Ashton, Ashton Raggatt McDougall & Robert Peck, Robert Peck von Hartel Trethowan



# The BIM Way

- Designer imagines an idea to solve a clients program
- Designer and Consultants create an Integrated Digital 3D Model of their ideas
- Consultants import 3D design (civil, struct., mech., elect., plumb., etc) into model creating a true representation of final design.
- Model is continuously reviewed for collisions and coordination with integrated project team
- Plan views, elevations, sections, and details dynamically change with model



# BIM DATA

- As-Builts
- Pothole Data
- New Design Data
- Garbage in/Garbage Out



Video

# NORTHWEST LRT EXTENSION





# Cost

- **3.2 Mile Extension** (\$185M construction estimate)
  - BIM Engineer – \$300K (18 month Pre-construction phase)
  - Potholes \$300-\$700 each
    - Approximately 700 potholes in the 3.2 mile extension

**Approx. Total Cost \$750,000 (0.4%)**



# Tidbits

- Found that Contractors are more advanced with BIM than Design Consultants, but changing.
- Consultant/Contractor relationship can get strained
  - Critique of design correctness?
  - Data responsibility and accuracy?
- Next step tool to a never ending risk
- Great Public Involvement Tool



**Questions?**



**METRO**





Greater Cleveland  
Regional Transit Authority

**ECTP Transit Oriented  
Development**

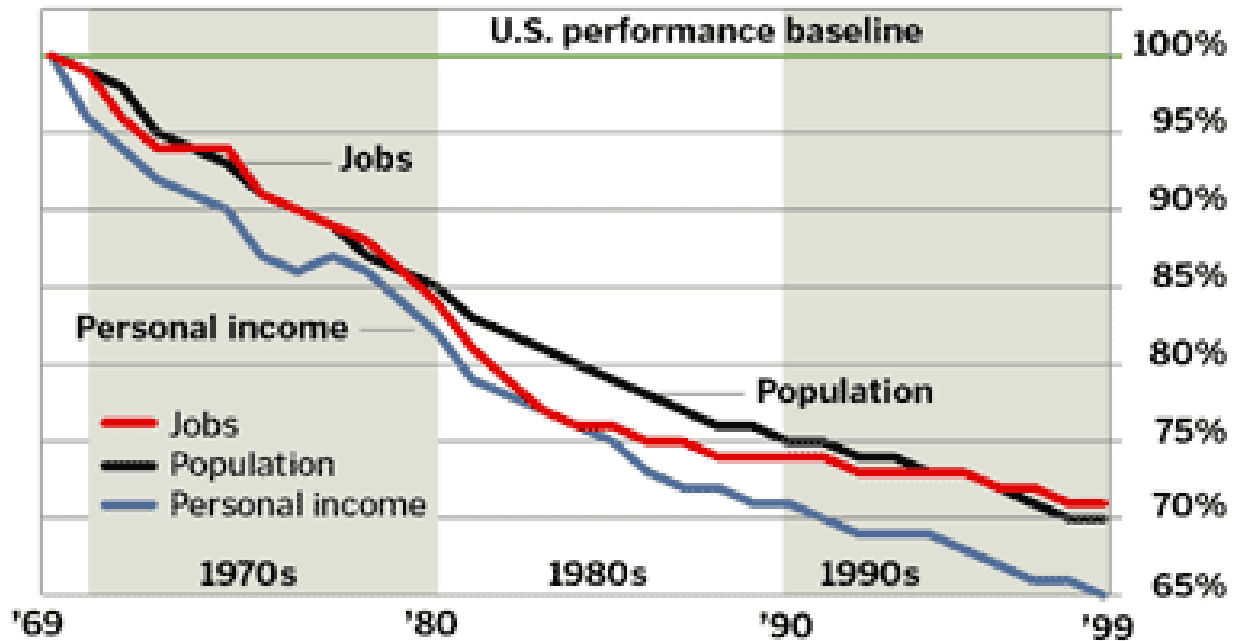
*Twenty-Ninth Transit Construction  
Roundtable*

**April 28-29, 2008**



# Existing Cleveland Economy

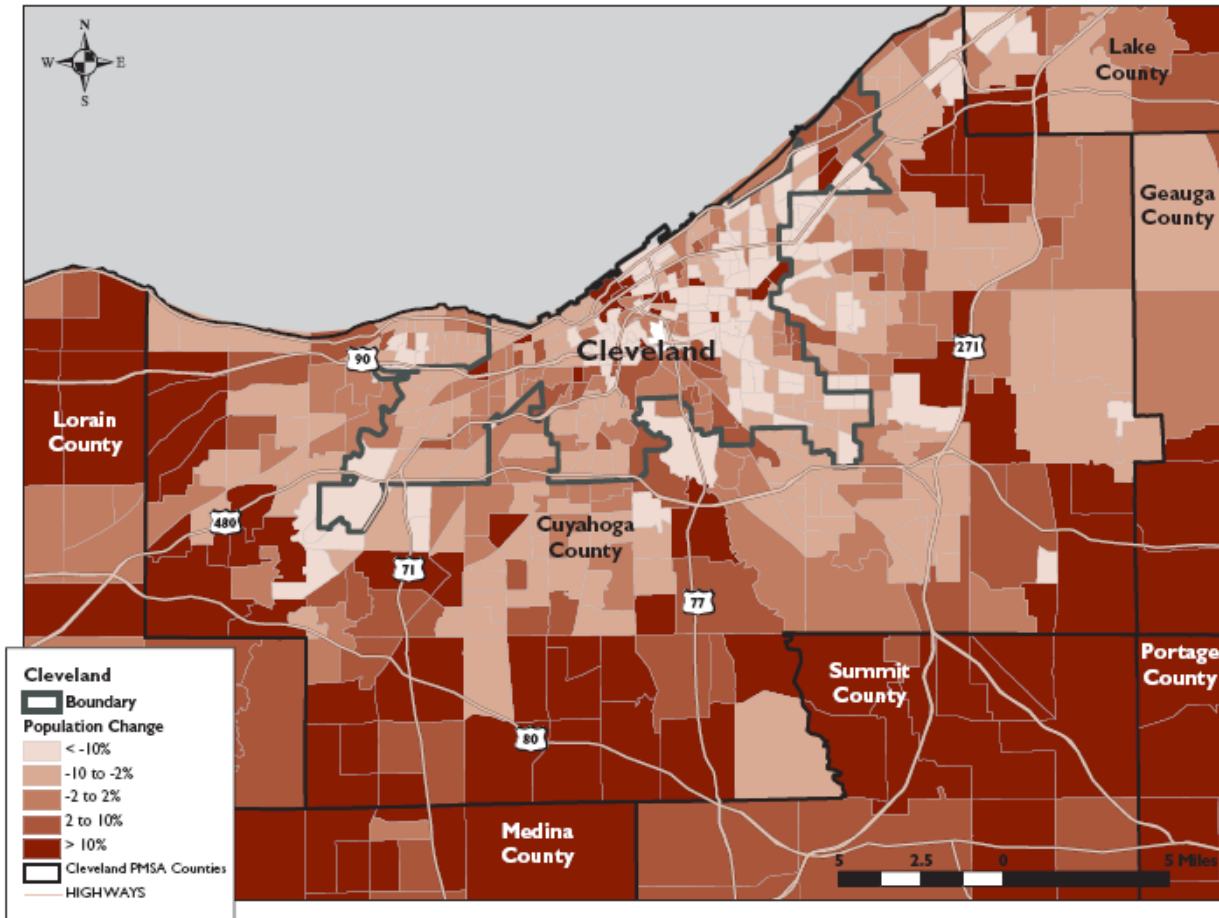
## Greater Cleveland's Growth Compared to the Nation



*From Cleveland Plain Dealer Series, Quiet Crisis.*

*Information compiled by Plain Dealer from Bureau of Economic Analysis, U.S. Department of Commerce*

# Population Loss



From *Cleveland: In Focus, A Profile from Census 2000*, Brookings Institute



# Foreclosures

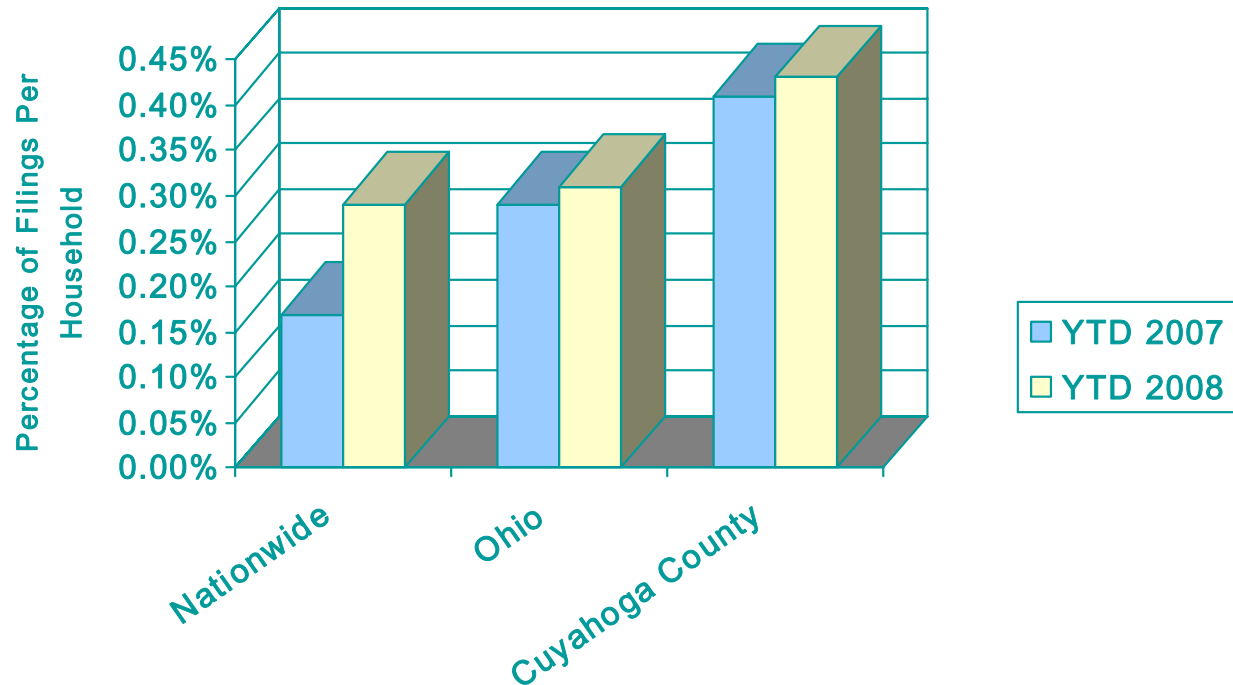
County	2007	2006	2005	2004	% Change '04 - '07
<b>Cuyahoga</b>	<b>994</b>	<b>1,358</b>	<b>1,942</b>	<b>2,413</b>	<b>-58.8</b>
Geauga	261	257	368	429	-39.2
Lake	597	806	903	997	-40.1
Lorain	971	1,384	1,876	2,088	-53.5
Medina	691	903	1,214	1,443	-52.1
Portage	469	773	840	814	-42.4
Summit	834	1,222	1,759	1,972	-57.7
<b>Regional</b>	<b>4,817</b>	<b>6,663</b>	<b>8,902</b>	<b>10,156</b>	<b>-52.6</b>
<b>Yr / Yr decline</b>	<b>-27.7%</b>	<b>-25.5%</b>	<b>-12.3%</b>		

From Crain's Cleveland Business, "Struggling to Survive", March 24-30, 2008

# Foreclosures

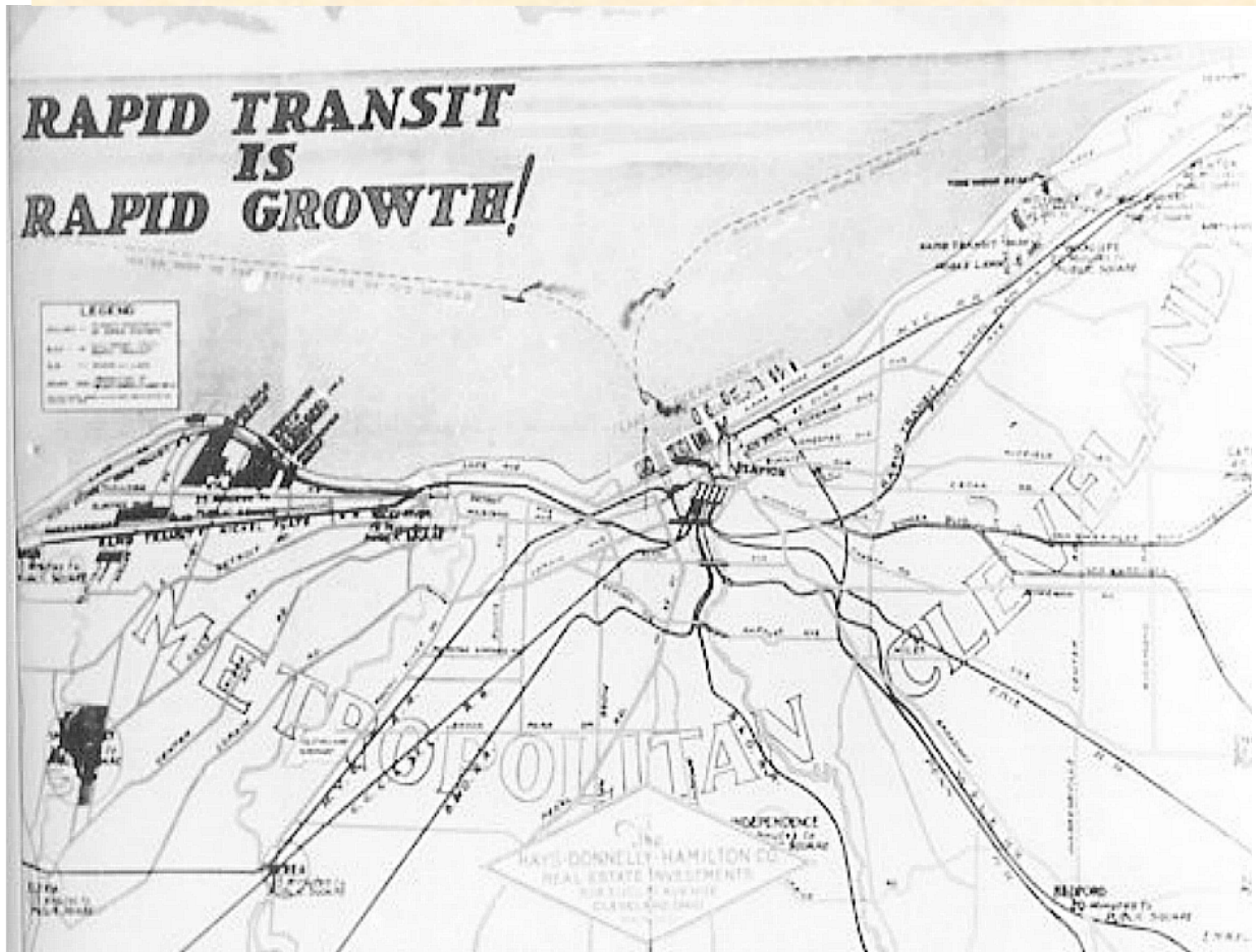


## Foreclosure Crisis – Cleveland versus State / Nation Real Estate Owned (REO) Property Only – Not including Filings



- Ohio is in the top 10 states for filings per capita
- Cuyahoga County had 11.5 filings / 1,000 population in 2007, the highest rate in the state

Circa 1920

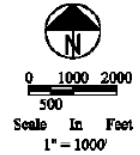




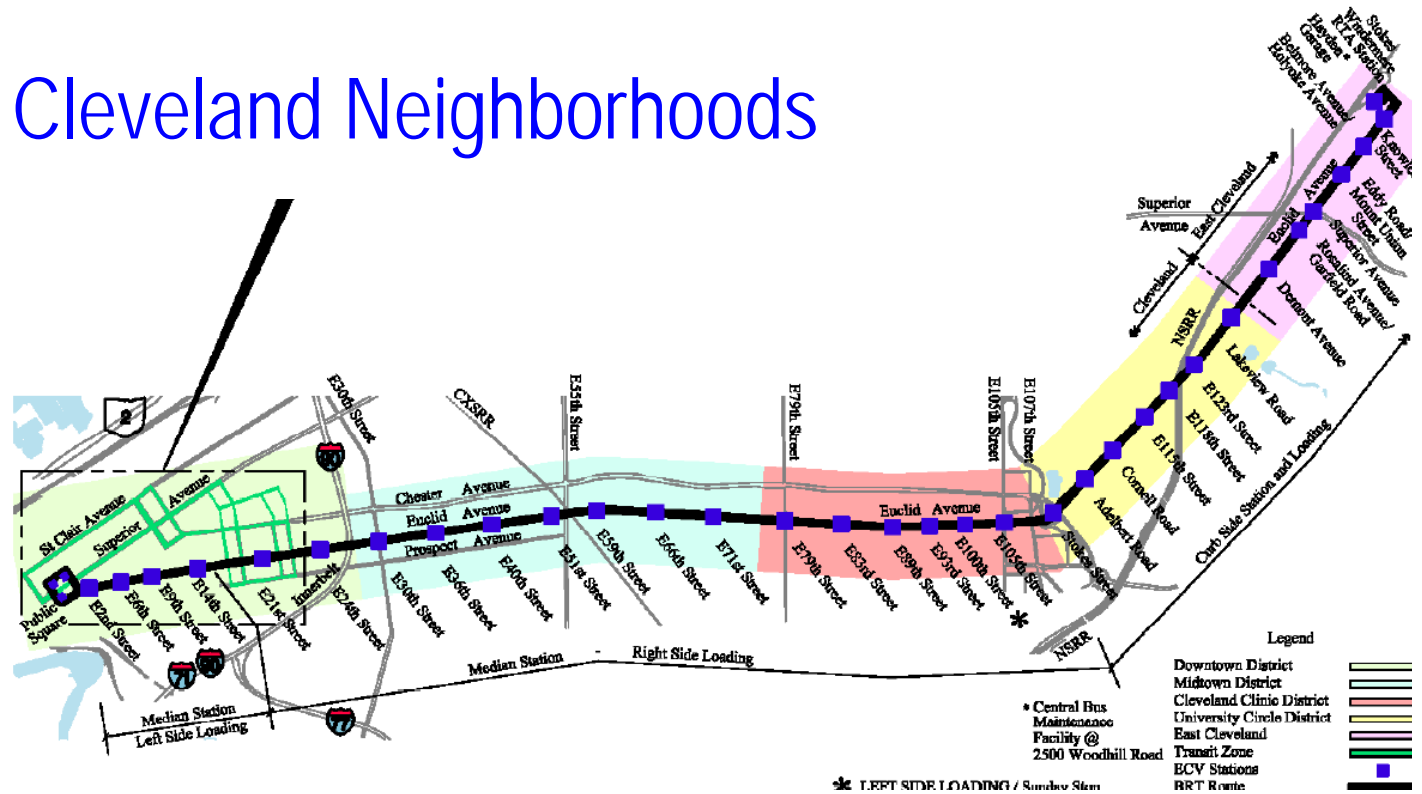
# ECTP MAP

Greater Cleveland Regional Transit Authority (GCRTA)  
Euclid Corridor Transportation Project (BRT)

Project Map



## Cleveland Neighborhoods



# Downtown



East Fourth Street, where developers have invested \$110 million, is humming with nightclubs, apartments, restaurants and a downtown bowling alley.



# Playhouse Square



More than \$61.2 million has been invested in the Idea Center and Hanna Theatre renovations.

# Cleveland State University



CSU's new master plan envisions a residential campus with new apartment buildings rising north and south of glassy new academic buildings along the north side of Euclid Avenue. Total value of new development is estimated at \$319.8 million.

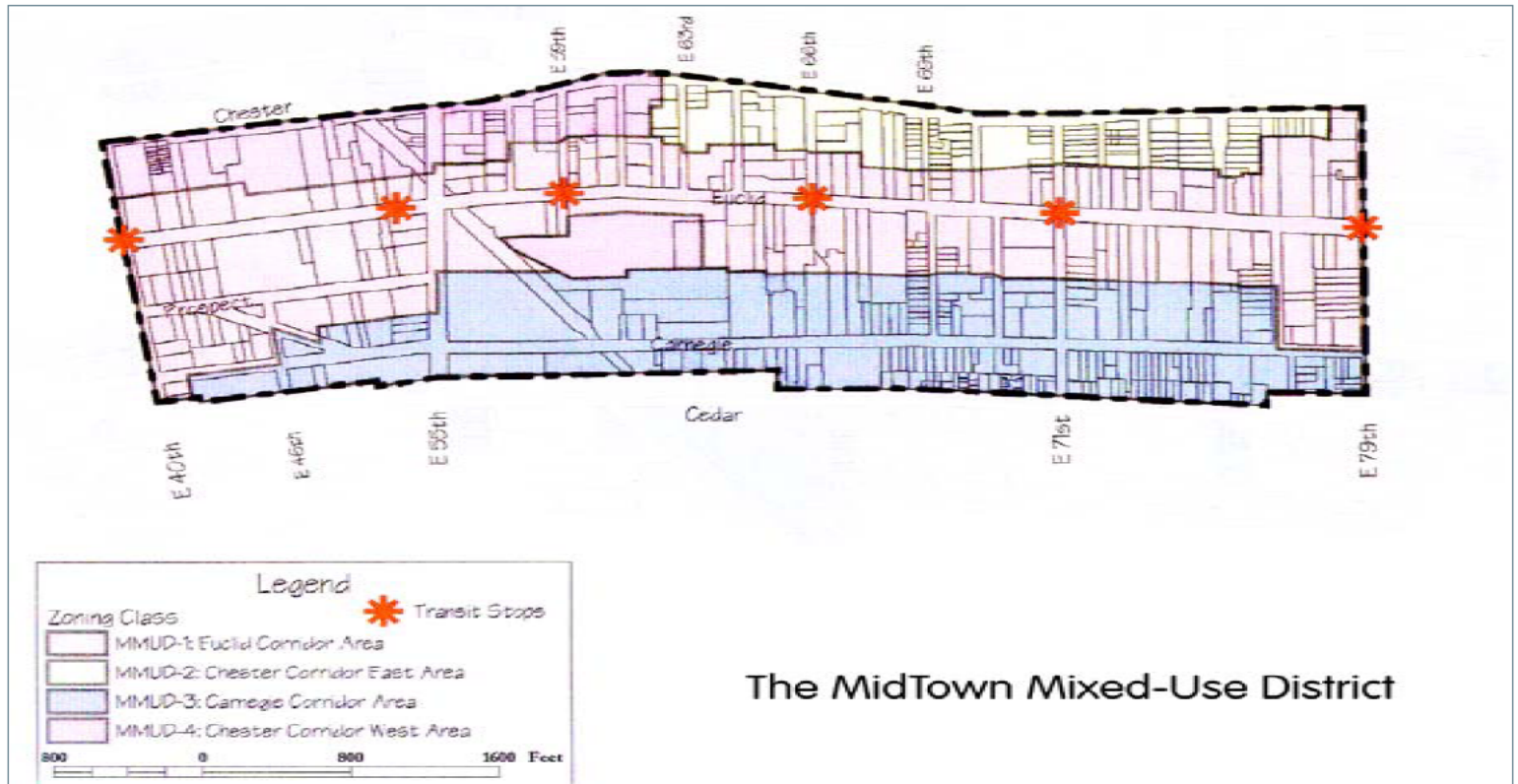
# Midtown



The price of an acre of land in the long-blighted Midtown area has doubled in the past five years from \$200,000 to \$400,000.



# Midtown Zoning Overlay



# Cleveland Clinic



The Cleveland Clinic is building \$868 million worth of new projects, including a giant new heart institute. Over \$468 million in new investment has already been constructed. This is over \$1.2 billion in new investment fronting on Euclid Avenue.

# University Circle



In University Circle, over \$3 billion has been or will be invested. The Cleveland Museum of Art is nearly halfway through a six-year, \$258 million expansion and renovation. The \$61.7 million Peter B. Lewis Building at CWRU was completed and University Hospitals has \$326 million worth of investments on tap.



# Actual vs. Forecasted Development

	No-Build	2008	2025
<b>Square Feet Development</b>	<b>3.7M</b>	<b>2.4M</b>	<b>7.9M</b>
<b>Number of Residential Units</b>	<b>2,528</b>	<b>2,943</b>	<b>5,428</b>
<b>Investment</b>	<b>\$5.5M</b>	<b>\$2.5B</b>	<b>\$1.75B</b>

# Long-Term Economic Benefit



**NEWS MINUTE**  
**NATIONAL**  
**Final chapter in writers strike?**  
 Striking Hollywood writers could be back to work Monday. A look at the contract, and TV television critic Mark Ebenfeld gives background on why the two sides came to an agreement. Details, A13

**SUNDAY ARTS**  
**Grammys often miss the mark**  
 The Grammys have a history of not honoring edgier acts, such as Amy Winehouse, who is up for awards in six categories. A look at tonight's ceremony. Details, J1

**BUSINESS**  
**Disaster works for them**  
 Resilience Capital Partners, a Braintree-based company, invests in failing manufacturing companies. Details, G1

**METRO**  
**ER wait times here less painful**  
 Waiting time for care in a Greater Cleveland emergency room is less than in other areas. Details, B1

**Cleveland police looking to arm up**  
 The force is considering buying military-style tactical rifles. Details, B1

**No PDQ today**  
 There is no PDQ section in today's paper. The section is moving to Monday, beginning this week. Check PDQ tomorrow and see why Monday won't be so bad anymore.

ONLINE

## The rebirth

Euclid Corridor project has already brought \$4.3 billion in new investment to the city



Bus stops designed by Robert F. Madsen International are a signature feature of the Greater Cleveland Regional Transit Authority's Silver Line on Euclid Avenue.

### Inside

See where the more than \$4 billion in investment is along the Euclid Corridor. A8

### THE REBIRTH OF RECLAMATION



STEVEN LITT | PLAIN DEALER ARCHITECTURE CRITIC

AMID ALL THE BAD NEWS ABOUT CLEVELAND'S ECONOMY, one big, positive number is sure to impress all but the most hardened cynics: \$4.3 billion. That's how much fresh investment — conservatively speaking — is being poured into the four-mile-long strip of land flanking Euclid Avenue, the city's Main Street, between Public Square and University Circle. The spending, which encompasses everything from mansions and hotels to housing and educational institutions, includes projects completed since 2000, those now under way and those scheduled for completion within five or six years.

### ANALYSIS

Private developers with government records as shrewd as yours are growing up in steel plants and auto plants along the corridor in the next five years or so. They include Douglas Price III, Nathan Zarembka, Art and Richard Moran, and Gordon Proctor.

The big reason for the surge is the Greater Cleveland Regional Transit Authority's \$300-million Euclid Corridor project, which is rehabilitating Euclid Avenue around a bus rapid transit line. Funded primarily by federal money, as a favor by government and partners in the 1990s on sports stadiums and the Rock and Roll Hall of Fame and Museum.

Media coverage has focused primarily on businesses that failed during construction, along with the hassle of negotiating a sea of orange traffic cones.

The mortgage-fraud-scandal critic, which has left as many as 12,000 homes vacant in Cleveland neighborhood, has also discovered the impending rebirth of Euclid Avenue.

BY STEVEN LITT

cleveland.com/news

See graphics, maps and extra photos and take a walk along Euclid Avenue in a video by The Plain Dealer's Lovette Terrell III.

## Value of Construction

- \$110,000,000

## Number Construction Manhours

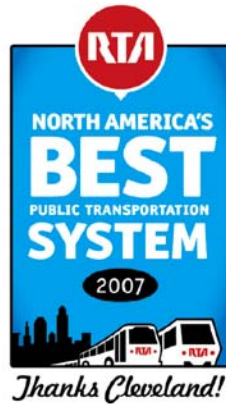
- 415,000

## Estimated Payroll

- \$13,280,000



# Questions



??????????



# Risk Assessment

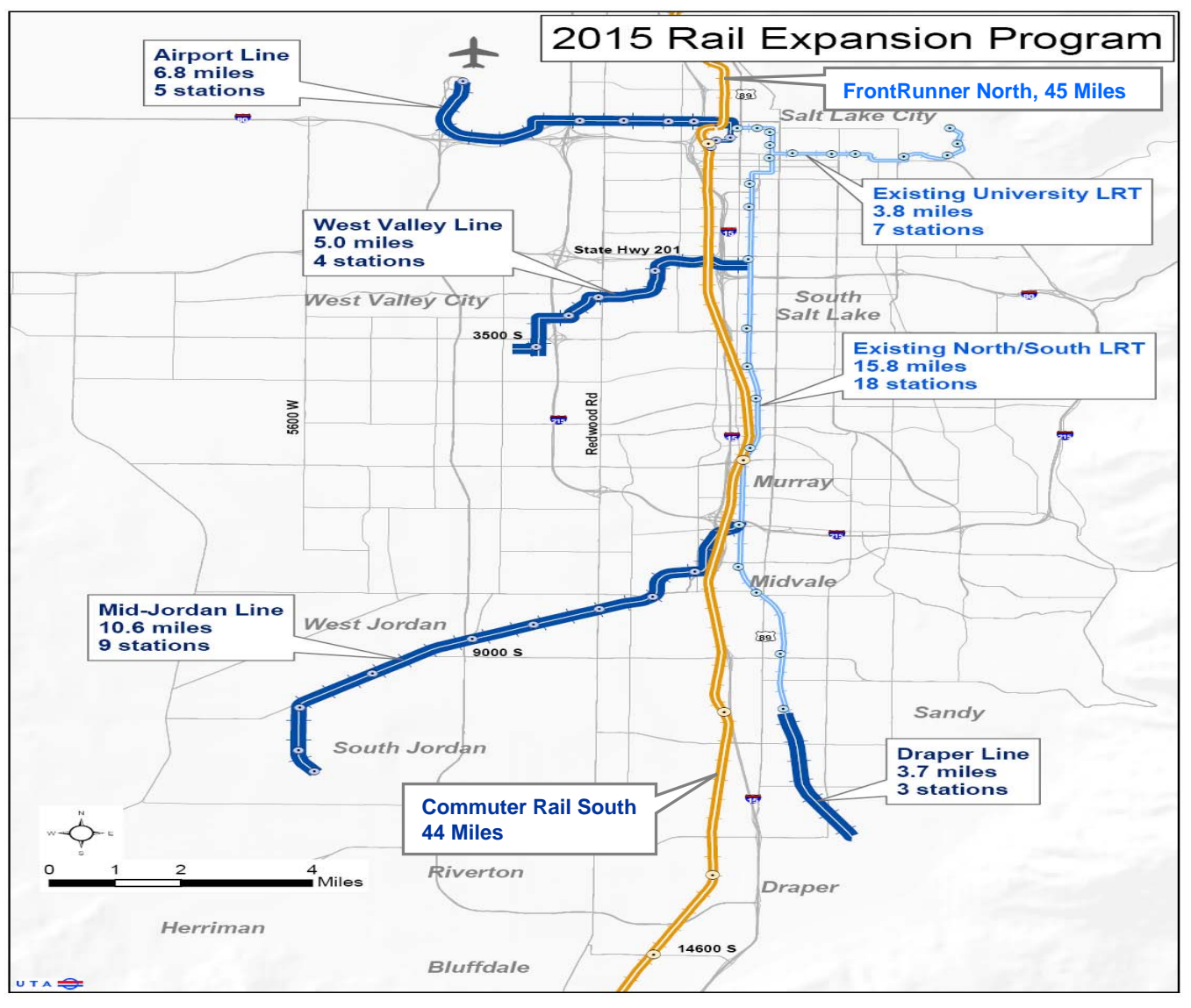
*29<sup>th</sup> Transit Construction Roundtable Meeting  
Cleveland, OH April 27-29, 2008*

*Presented by E. Gregory Thorpe, PE  
Manager of Light Rail Engineering & Construction  
Utah Transit Authority*

# AGENDA

- I. Application of appropriate contingencies in today's marketplace
- II. Pre-PE Cost Review
- III. Pre-FD Risk Assessment
- IV. Strategies for negotiated construction procurements (contract packaging)
- V. Private Public Partnership and the role of the grantee

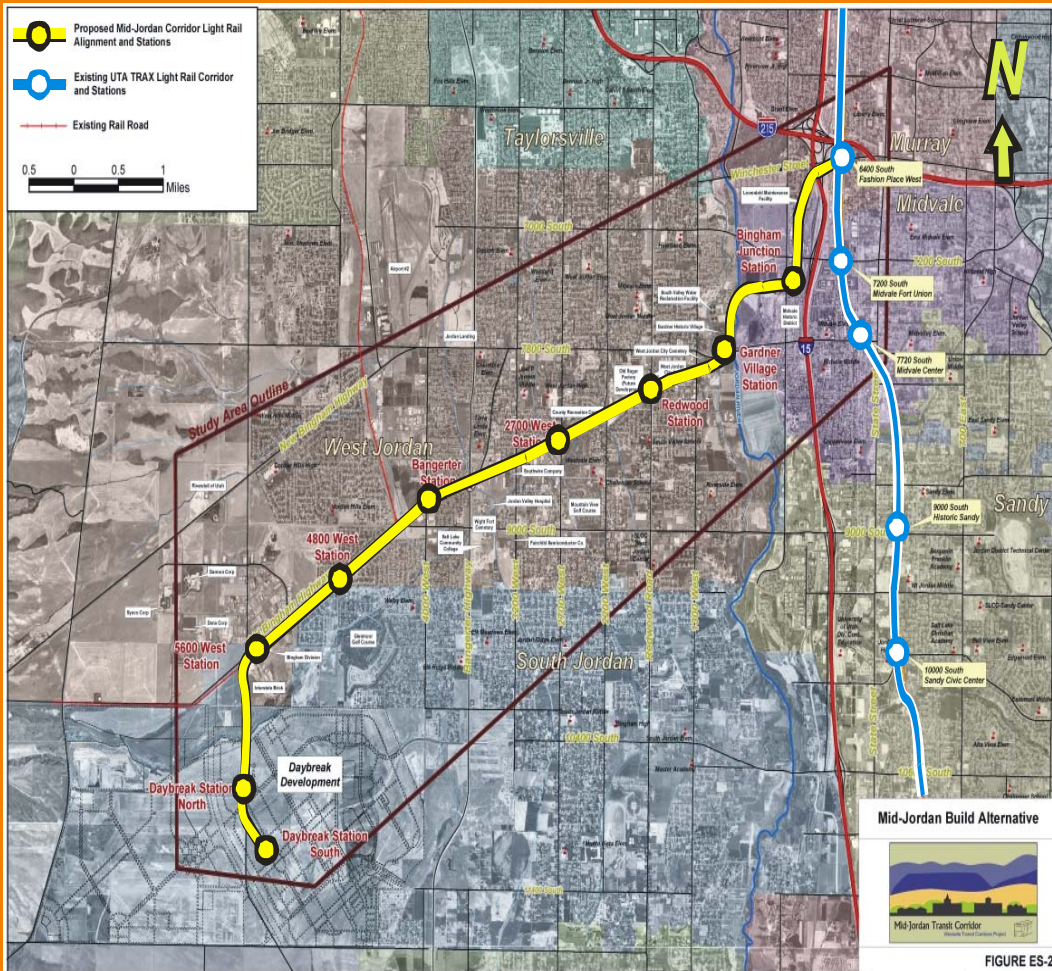
# Transit 2015 Program



# Mid-Jordan LRT Line

## Project Overview

- 10.6 miles Dbl-Track
- 10 New Stations
- 15-minute frequency
- 28 LF Vehicles
- \$535 Million (YOE)
- PE May 2007
- FEIS June 2007
- ROD Sept. 2007
- FD anticipated 4/28/08
- FFGA anticipated Oct. 2008
- Revenue June 2011



# I. Application of Appropriate Contingencies

- Probabilistic Risk Analysis
  - What can happen?
  - How likely is it that it will happen?
  - If it does happen, what are the consequences?
- Risk is dependant upon the phase of the project
  - Conceptual, Advanced Conceptual,
  - Fundamental, Preliminary,
  - Advanced Preliminary, or Final Design
- It is dependant upon “What did I forget?”
- Likelihood of occurrence and Probable consequences
- Estimation of Probability vs. Severity

# Risk Scoring Matrix

RISK SCORING MATRIX - RISK QUANTIFICATION					
		Severity of Impact			
		Project Threatening	Serious Challenge	Moderate Challenge	Minor Challenge
Probability of occurrence	High	1	1	1	2
	Moderate	1	1	2	3
	Low	1	2	3	3
	Very Low	2	3	3	3

**Score depends upon professional judgment and where project is in the process!**

A score of 1 adds 25-35% cost. (Risk is significant and mitigation is required)

A score of 2 adds 15-25% cost. (Risk is moderate and management intervention and review are required)

A score of 3 adds 5-15% cost. (Risk is low and some mitigation may be required)

PROBABLE COST MATRIX (PERCENTAGE INCREASE TO 2006 BASE COST SHOWN)					
		Severity of Impact (% increase to base cost)			
		Project Threatening	Serious Challenge	Moderate Challenge	Minor Challenge
Probability of occurrence	High	35%	30%	25%	20%
	Moderate	30%	25%	20%	15%
	Low	25%	20%	15%	10%
	Very Low	20%	15%	10%	5%

## II. Pre-PE Cost Review

- Began July 2006
- Project approx. 30% complete / DEIS complete
- Initial Cost \$345 M (2006\$)
- PMOC Initial Report \$425 M, Oct. 2006
- UTA Revised Cost \$407 M
  - \$12 M missing scope
  - \$25 M inadequate contingency (to approx. 30%)
  - \$30 M added finance charges (to \$45 M)
- PMOC and FTA concurred, Nov. 2006 (5 mo.)
- Process added value



# III. Pre-FD Risk Assessment

- Began August 2007 (9 mo. after Pre-PE Cost Review, plans 60% complete)
  - Submitted plans, specs, studies, cost estimates, schedules, operational plans & studies, environmental documents, agreements, etc.
  - UTA conducted preparatory in-house Risk Assessment in May 2007 and updated the scope and costs to 2007\$
- Characterization workshop Oct. 2007
  - Scope, Cost and Schedule review
  - D/B Contractor and Independent Cost Estimator participated
  - Risk Mapping and Risk Register developed by PMOC, FTA and UTA
- Initial Cost \$477 M (2007\$), \$537 M (YOE) and Nov. 2010 ROD
- Budget, Schedule and Contingency Workshop Dec. 2007
- FTA PG No. 35 Report = \$532 M (YOE) and June 2011 ROD
- PG No. 40E, F & G Report Jan. 2008 (6 mo. duration)
  - Concurred \$537 M cost & June 2011 ROD schedule
  - Also established Secondary (Triggered) Mitigation Measures

# Pre-FD Assessment concluded with Contingency Management Plan/ Project Execution Strategy

- **Contingency Hold Points**
  - \$70M at entry to FD (1 Qtr. 2008), \$20M Distributed Contingency (available to next hold point)
  - \$50M at 20% Constructed (1Qtr. 2009), \$20M Distributed Contingency
  - \$30M at 50% Constructed (4Qtr, 2009), \$15M Distributed Contingency
  - \$15M at Start-up (1Qtr. 2010), \$5M Distributed Contingency
  - \$10M available after ROD (2Qtr. 2011)
- **Secondary (Triggered) Mitigation Measures**
  - 1Qtr. 2008 to 4 Qtr. 2009- Cost Savings \$29M, Schedule Savings 187 days
  - 3Qtr. 2010 (75% constr.)- Cost Savings \$28M, Schedule Savings 75 days

## IV. Strategies for Negotiated Construction Procurements


- Mid-Jordan used D/B One Step process
  - Best Value Based Selection (July to Oct. 2007, before pre-FD RA)
    - Technical Qualifications
    - Price Proposal
      - Quantities and Bid Proposal Price
- In-House ICE (Independent Cost Estimate)
  - MJ Results: ICE \$225M, (New Starts \$225 M YOE w/ Contingencies)
  - 3 Proposers avg. price \$214M
  - Low price \$205M
- CM/GC for Other 2015 Projects
  - Use experience from FrontRunner North and Mid-Jordan in Negotiations
  - Continue use of Risk Assessment and ICE

# V. Public Private Partnerships (PPP)

- Kennecott Land's Daybreak Development New Town Center (quazi-PPP)
  - KLC Pays for all elements beyond standard UTA baseline system
    - ballasted track on concrete ties, high profile OCS, traction power substations, center station platforms, park and ride lots
  - KLC Grants no-cost easement for track corridor, UTA to use as in-kind donation
  - KLC Grants no-cost lease for parking stalls, in-kind donation
  - KLC Provides baseline infrastructure (similar to being in an existing town)
  - KLC Pays for any betterments
    - side platforms, paved track, mid-station crossings, traffic signals, etc.
  - UTA base \$35 M, KLC value \$11 to \$13 M (approx. 3:1)



Thank You  
Questions



**Central Subway**



# *Why San Francisco Needs the Central Subway*

# Chinatown - Stockton Street





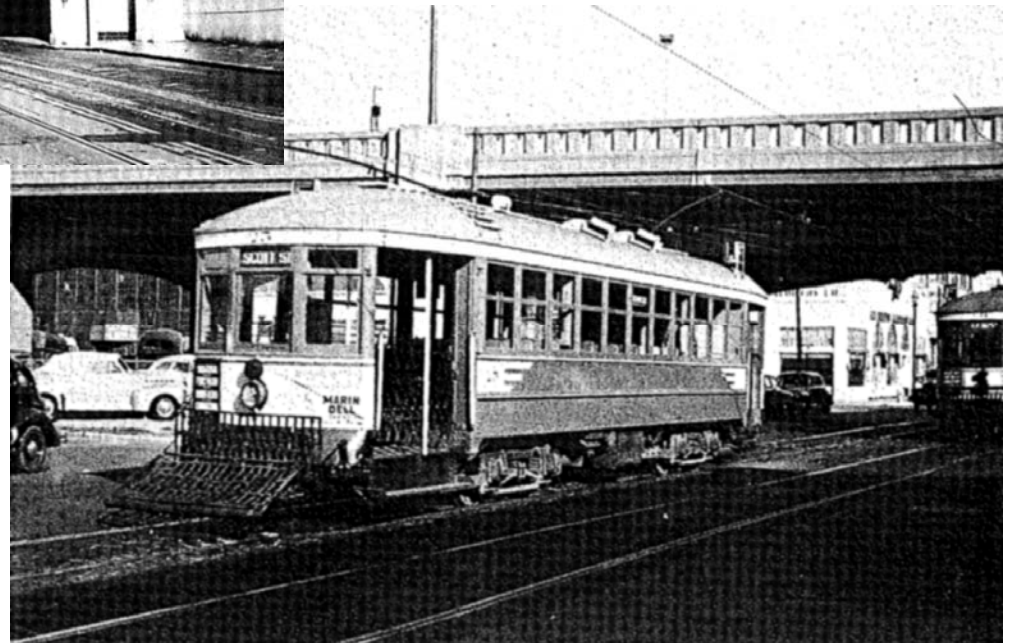
# Chinatown - Stockton Street



# Chinatown



# *Then...*



# *And Now...*

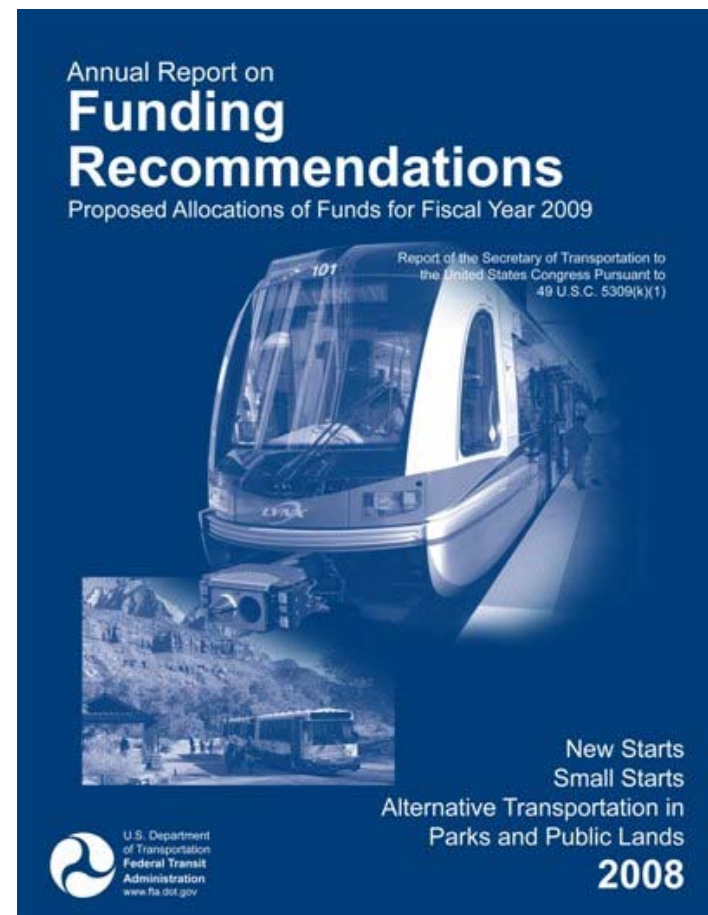


# Central Subway Benefits

- Trip time reduced from 20 minutes to 7 minutes from 4th and King to Chinatown
- Subway reduces surface congestion & supports City's Transit First Policy
- Improves regional connections to Caltrain, BART and Muni Metro
- Serves a transit dependent area
  - 26% increase in population
  - 61% increase in employment
  - 68% in Central Subway corridor are without a vehicle
- Improves interim T-Third operation

# FTA New Starts Ratings

- Land Use Benefits: High
- Environmental Benefits: High
- Project Justification: Medium-High
- Mobility Improvements: Medium-High
- Local Financial Commitment: Medium
- Capital Finance Plan: Medium
- Operating Finance Plan: Medium
  
- ***Overall Project Rating: Medium-High***

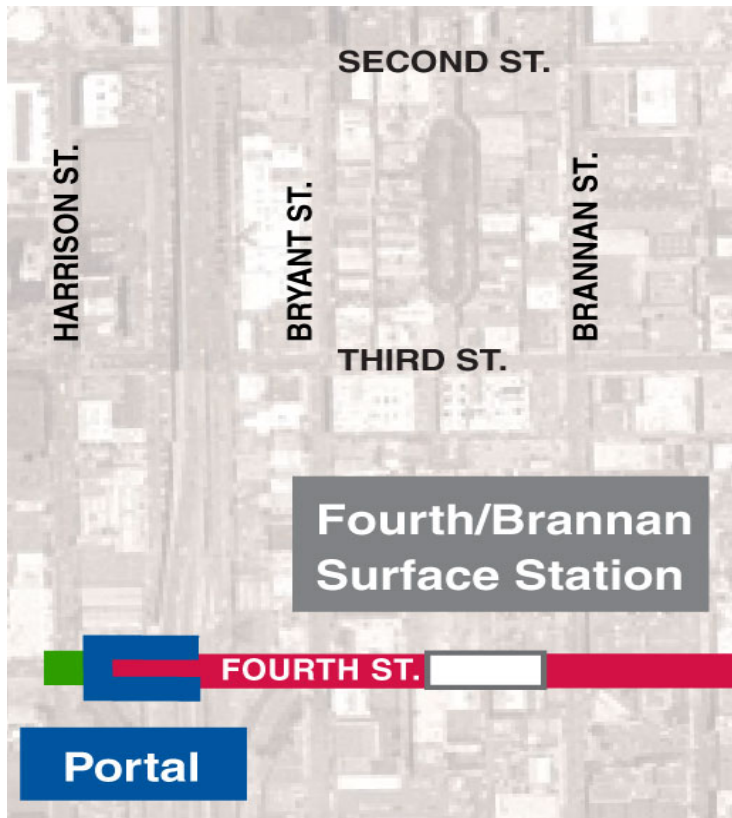




**Central Subway (Phase 2)  
2008 Locally Preferred  
Alternative (LPA)**

**T Third Line  
(Phase 1)**

# Fourth/Brannan Surface Station



Existing Fourth & King Station  
(Typical)



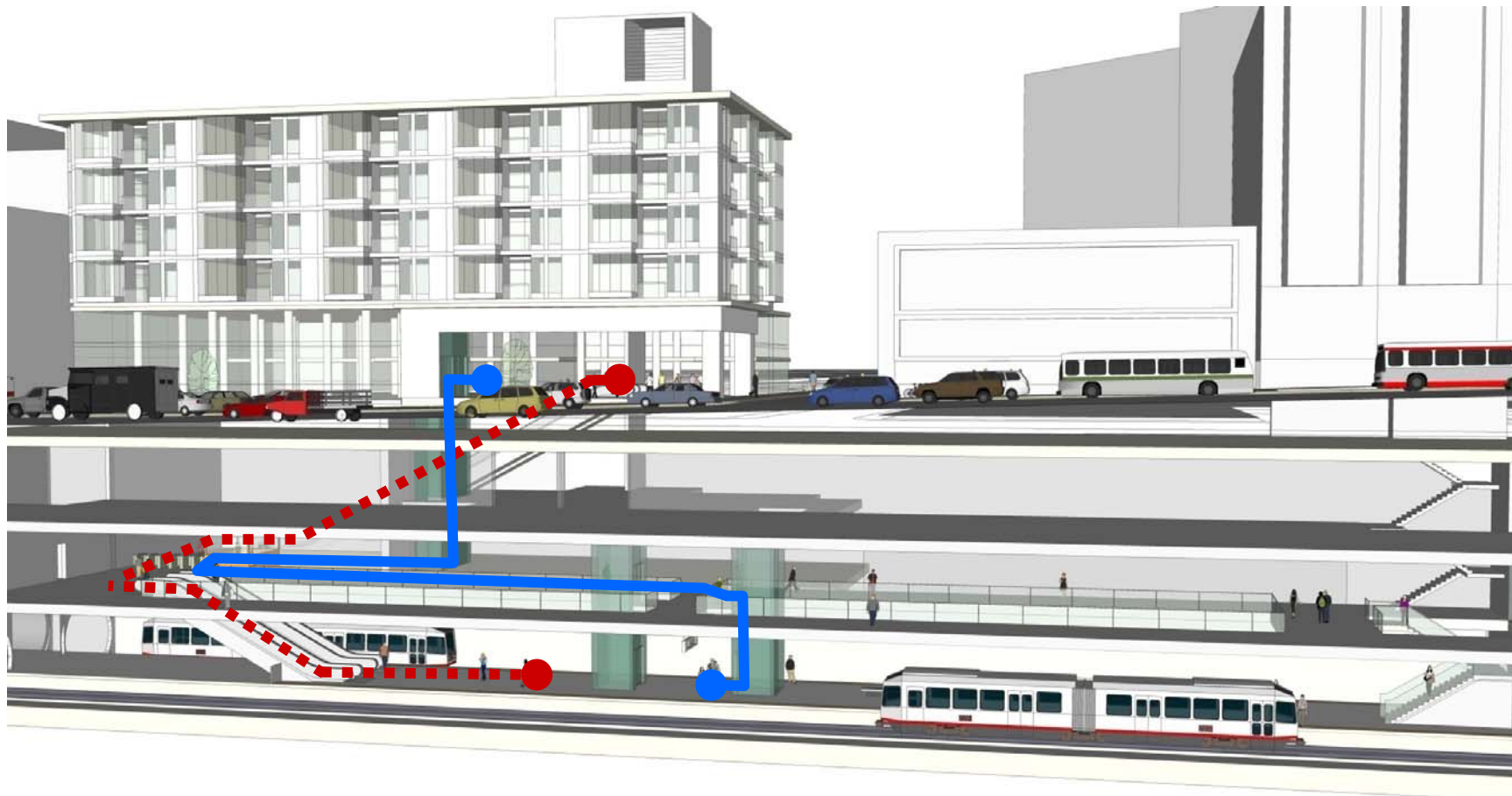


Existing Fourth & King Station





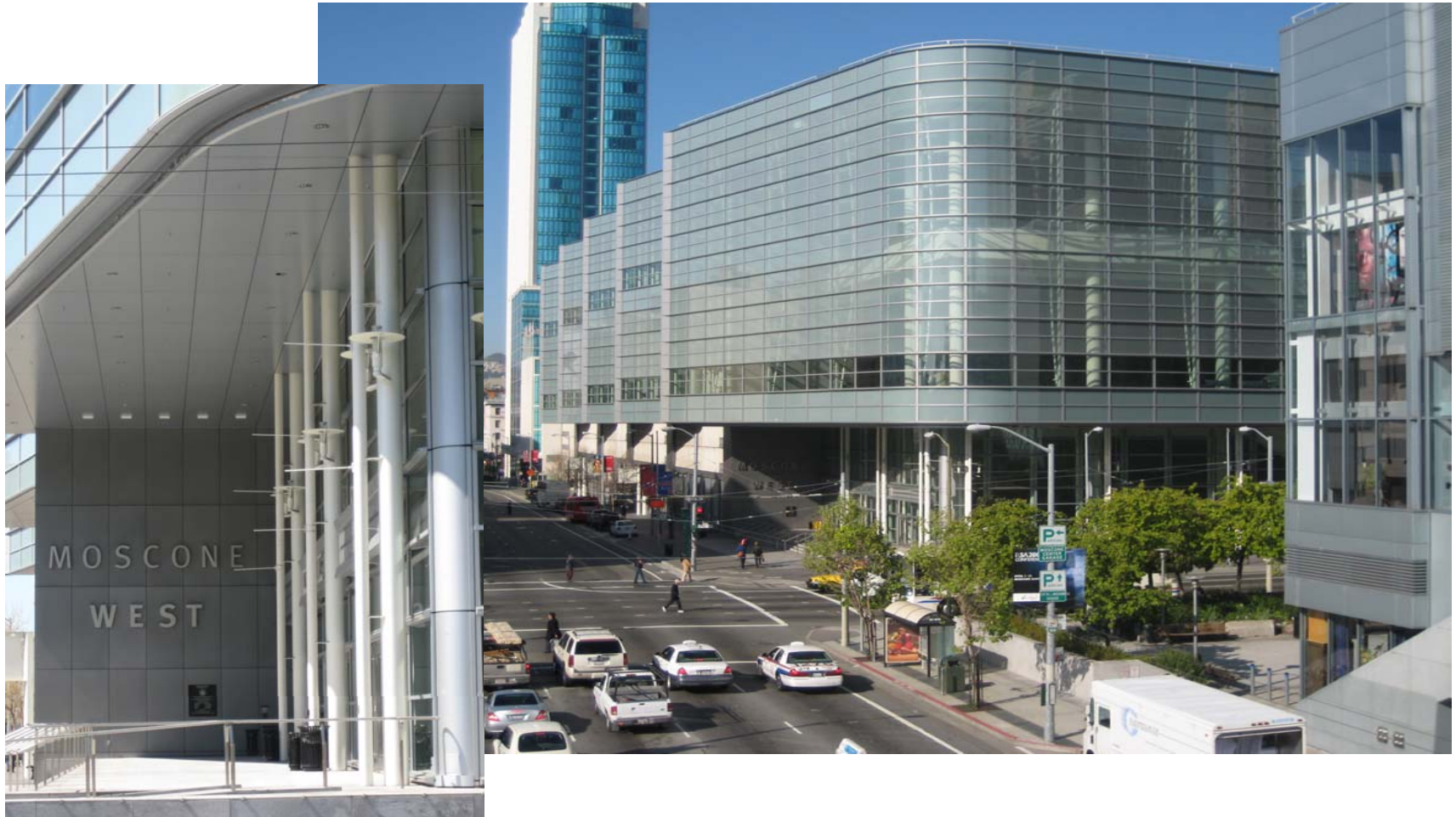
# Moscone Station



■ ■ ■ ■ ■ ■ ■ ■ Stair/escalator access

■ ■ ■ ■ ■ ■ ■ ■ Elevator access

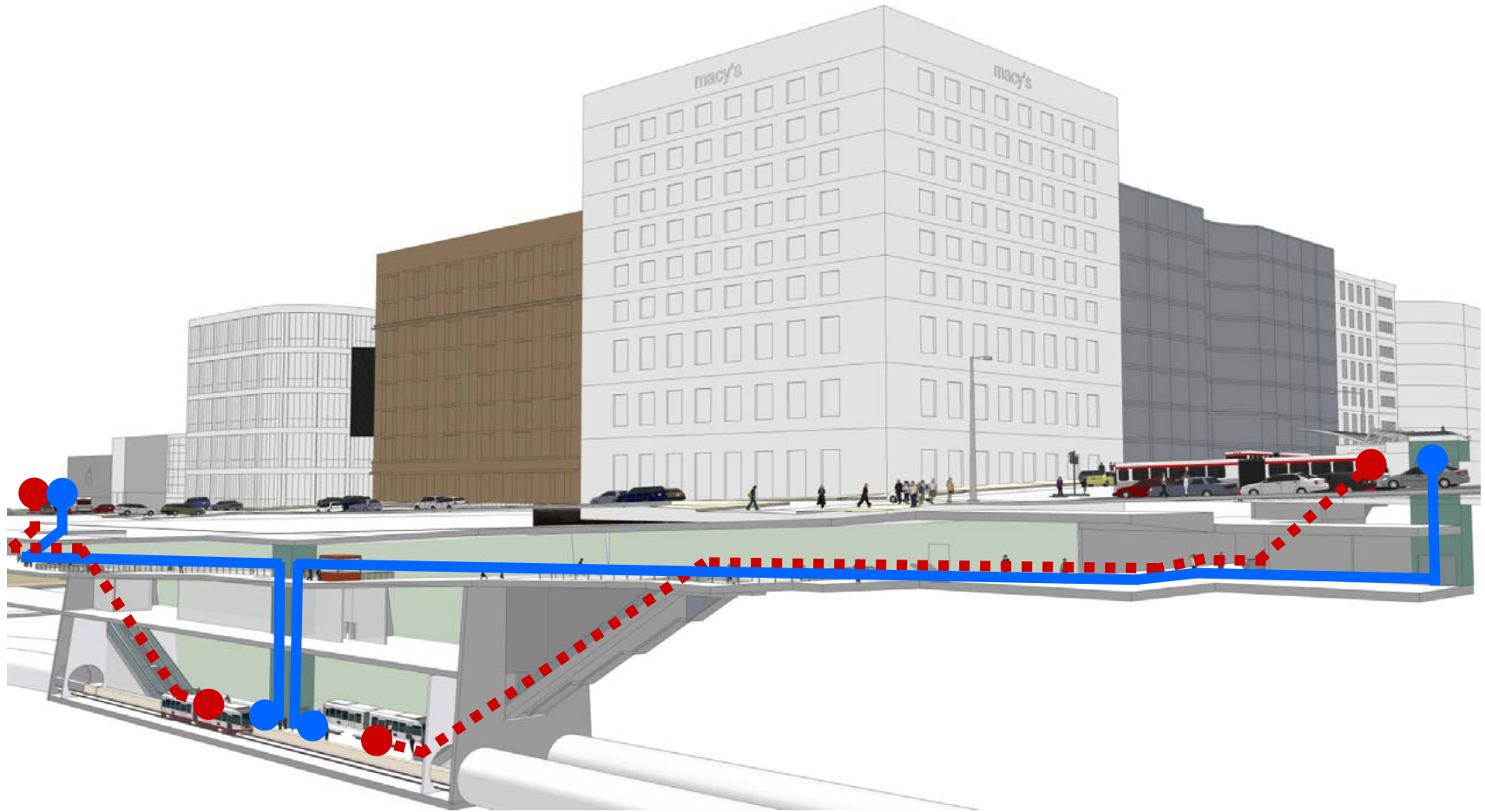
# Moscone Center



# Verba Buena Gardens



# Union Square/Market St. Station



■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Stair/escalator access

■■■■■■■■■■ Elevator access

# Market Street

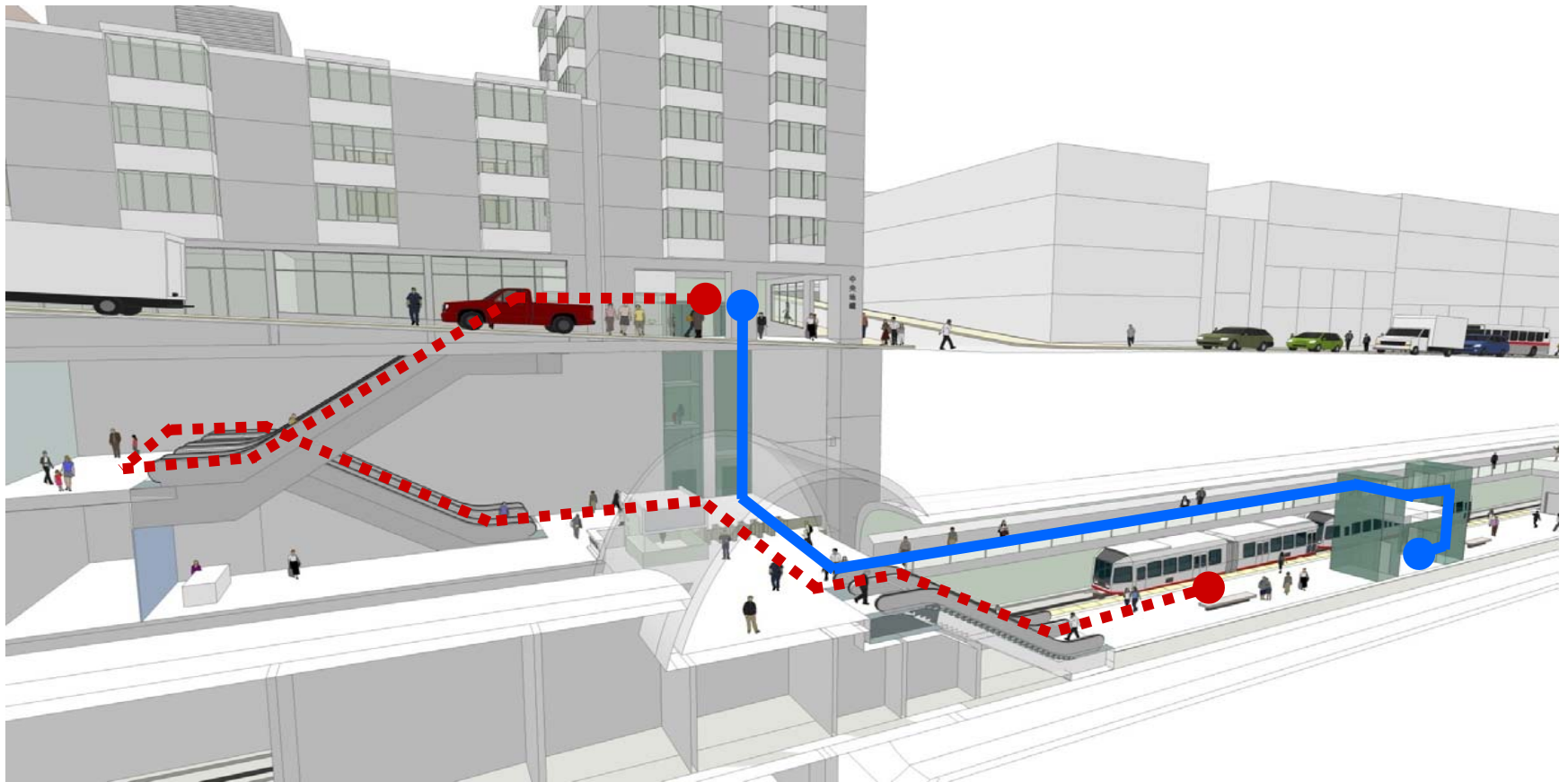




# Union Square



# Chinatown Station



Stair / escalator access



Elevator access

# Chinatown



# Chinatown



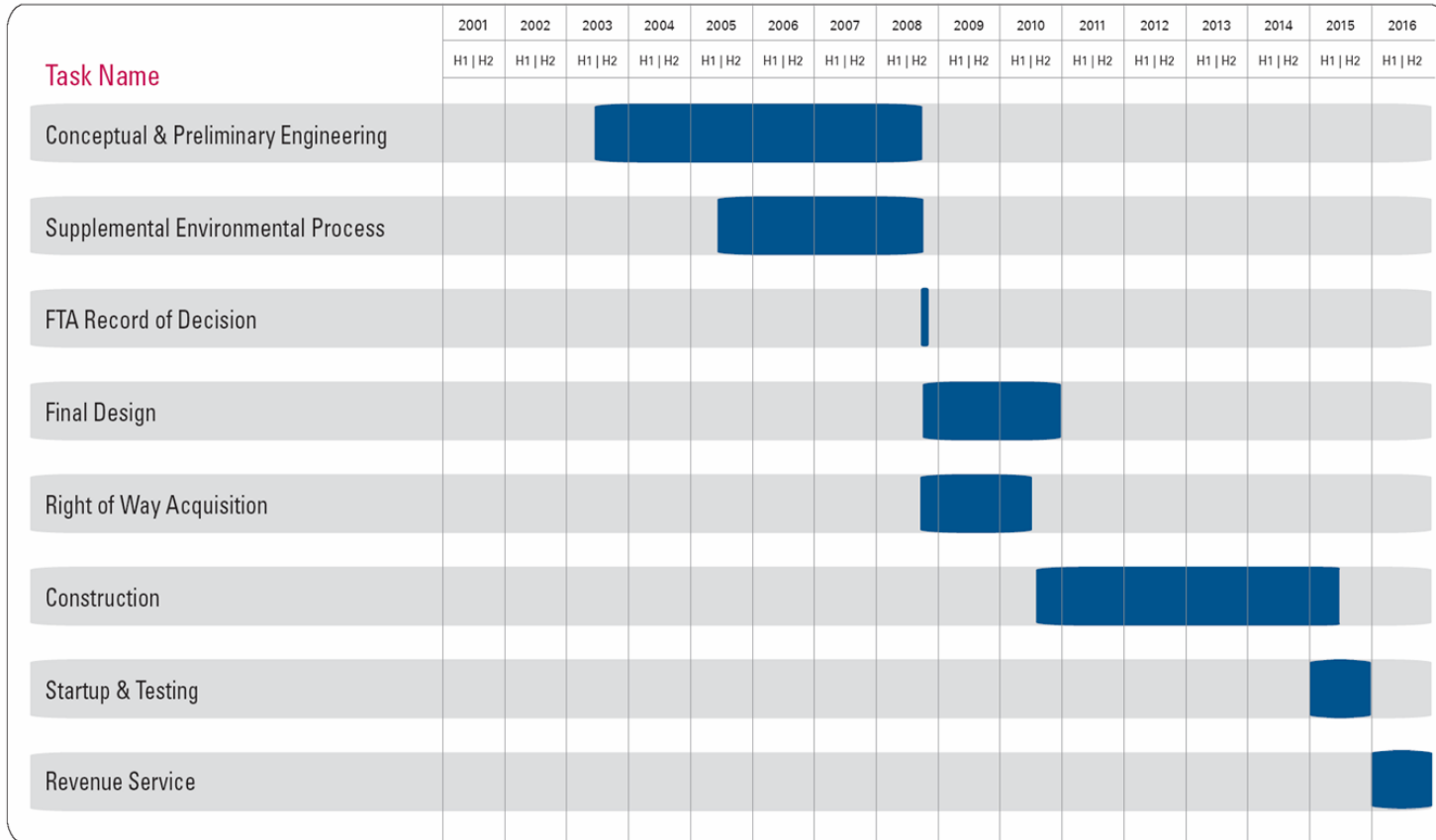
# North Beach



# Capital Costs

Source	T-Third (Phase 1)	Central Subway (Phase 2)	Total	% of Total
Federal	\$75.2	\$762.2	\$837.4	43.2
State	\$190.1	\$356.2	\$546.3	28.2
Local	\$382.7	\$171.3	\$554.0	28.6
Total	\$648.0	\$1,289.7	\$1,937.7	100.0

# Project Schedule

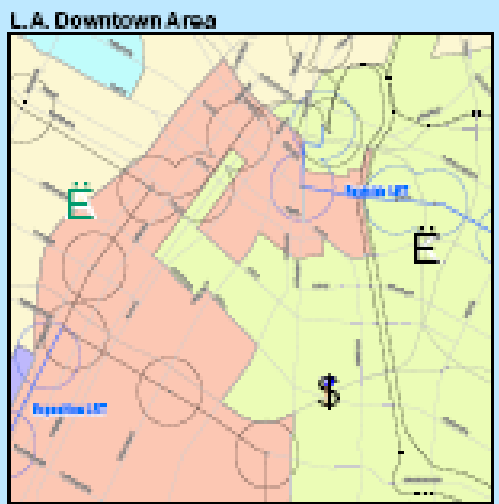
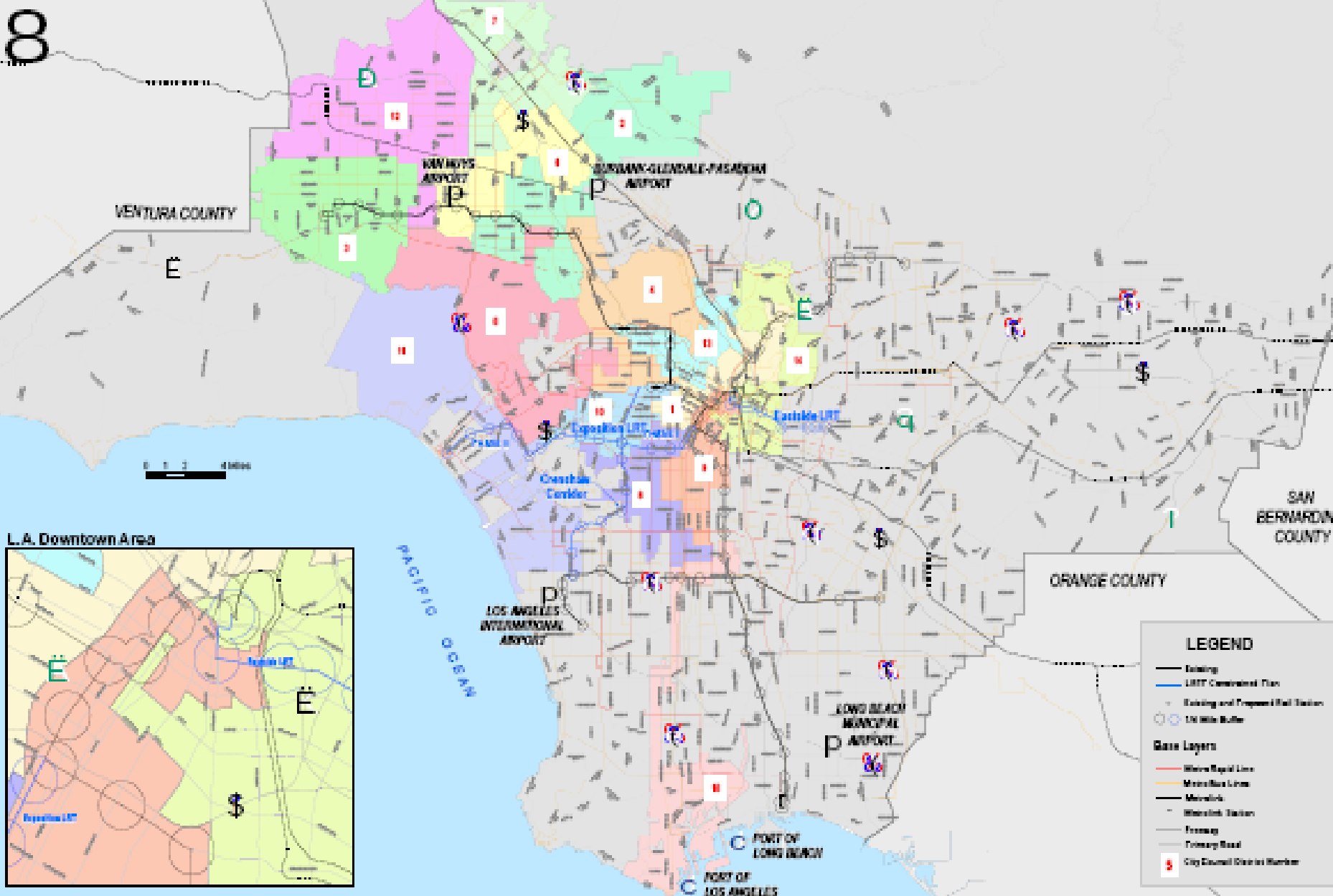


# Metro Transit Oriented Development

## Real Estate Joint Development







**LEGEND**

- Existing
- LRT Construction Plan
- Existing and Proposed Rail Station
- 1/4 Mile Buffer

**Base Layers**

- Metro Rapid Line
- MetroBus Line
- MetroLink
- MetroLink Station
- Freeway
- Freeway Road
- City Council District Number

# Metro Joint Development Program

## Completed

- 1 Hollywood/Highland
- 2 Hollywood/Western
- 3 Wilshire/Vermont Apts
- 4 Willow
- 5 Del Mar
- 6 Memorial Park
- 7 Sierra Madre Villa Phase I
- 8 Union Station (Metro HQ)

## Under Construction

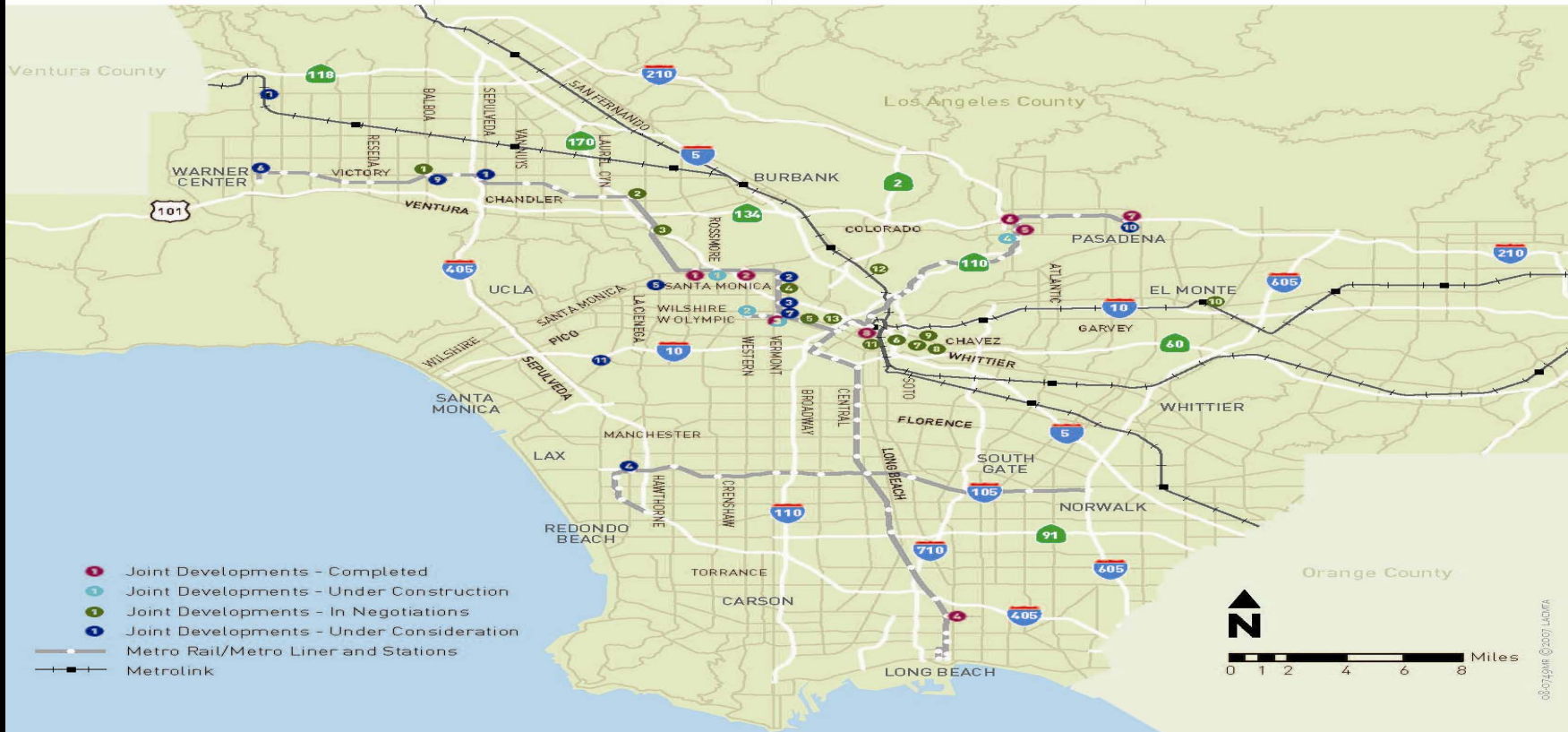
- 1 Hollywood/Vine
- 2 Wilshire/Western
- 3 Wilshire/Vermont School
- 4 Fillmore

## In Negotiations

- 1 Balboa
- 2 North Hollywood
- 3 Universal City
- 4 Vermont/Santa Monica
- 5 Westlake/MacArthur Park
- 6 Mariachi Plaza
- 7 Soto
- 8 1st & Lorena
- 9 Chavez & Soto
- 10 El Monte
- 11 Santa Fe
- 12 Taylor Yard
- 13 Temple & Beaudry

## Under Consideration

- 1 Sepulveda Park/Ride
- 2 Vermont/Sunset
- 3 Vermont/Beverly
- 4 Aviation/LAX
- 5 West Hollywood (Division 7)
- 6 Canoga Park/Ride
- 7 Wilshire/Shatto Bus Layover
- 8 Chatsworth Metrolink
- 9 Balboa Park/Ride
- 10 Sierra Madre Villa Phase II
- 11 Washington/National



# METRO'S ROLE IN LAND USE

## PLANNING/DEVELOPMENT

### **Metro Joint Development Program Goals**

- Encourage comprehensive planning and development around station sites and transit corridors.
- Reduce auto use and congestion through encouragement of transit-linked development.
- Promote and enhance transit ridership.
- Enhance and protect the transportation corridor and its environs.
- Enhance the land use and economic development goals of surrounding communities and conform to local and regional development plans.
- Generate value to the Metro based on a fair market return on public investment.

# Hollywood/Highland Metro Red Line



# Hollywood/Vine, Metro Red Line Station



# Hollywood and Vine Metro Red Line



Proposed Development Models

# Wilshire/Vermont Metro Red Line Renderings

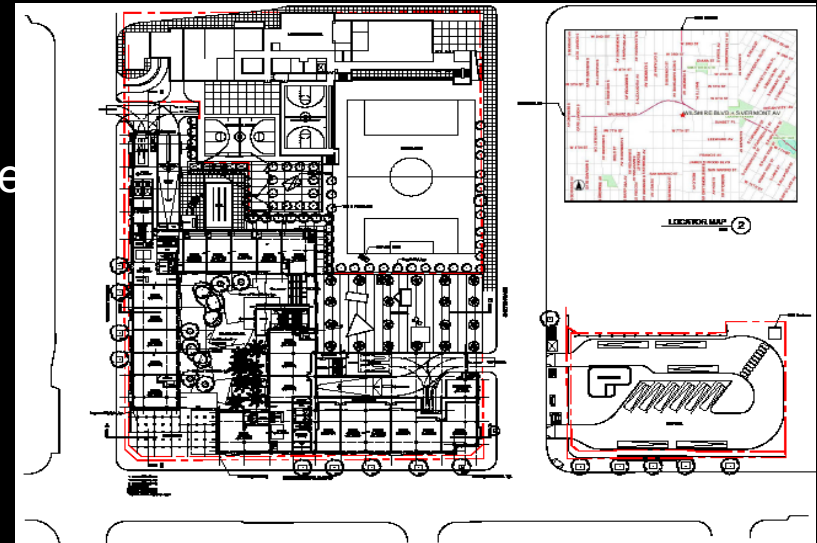


# Wilshire/Vermont Metro Red Line



Proposed mixed-use project includes:

- 450 residential units
- 45,000 square feet of commercial space
- Child Care Center
- 800 student middle school
- 700 space underground parking structure





# Westlake/McArthur Park Metro Red Line



Proposed project includes:

- 199 affordable housing units
- 50,400 square feet of retail
- 503 space parking structure



# Chavez-Soto

- 3.5 acres
- 100 apartments
- 50,000 s.f. retail



# Summary of Proposed Development Programs

## Lowe Enterprises - NoHo *ART WAVE*

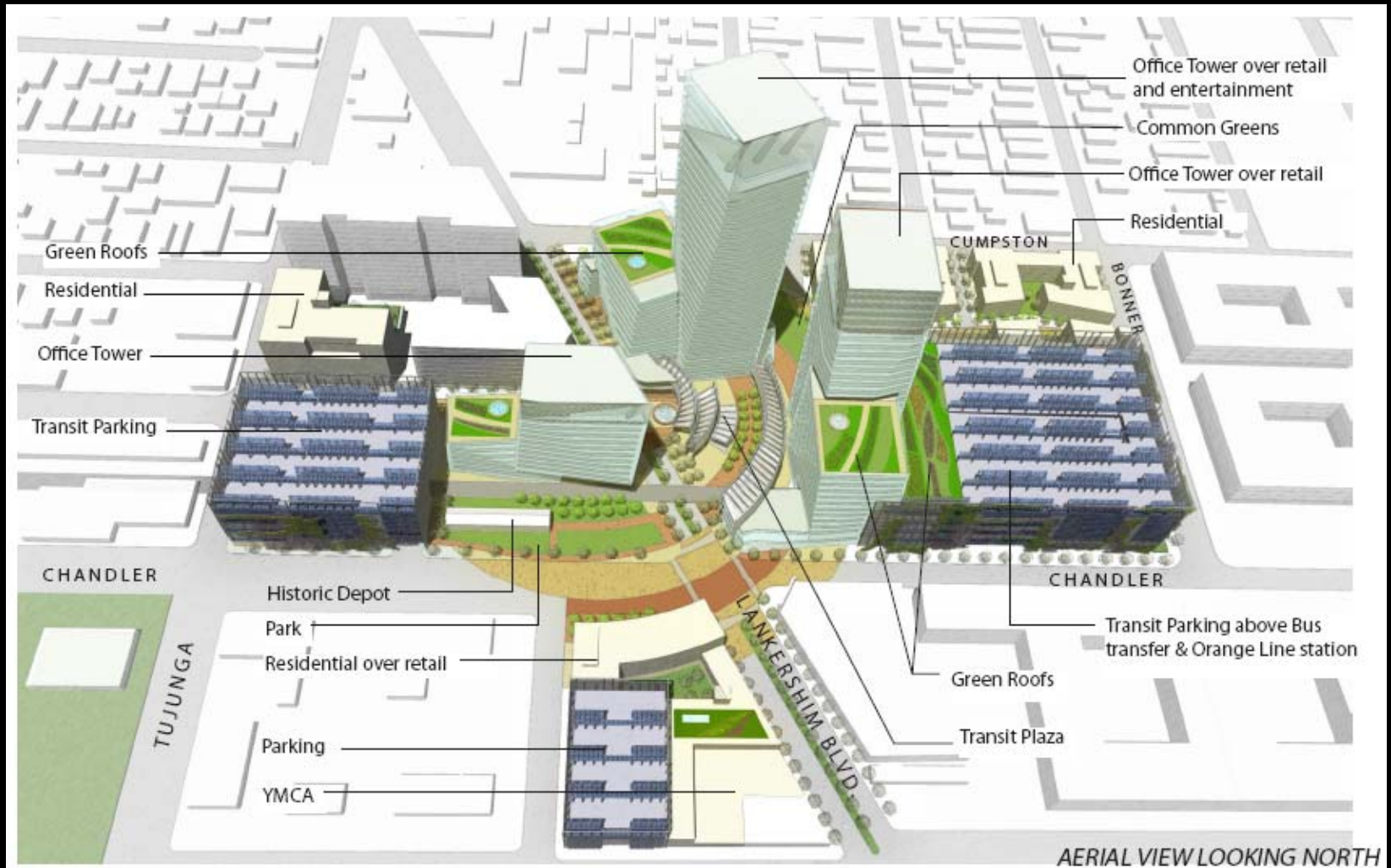
562 units residential, including 15% affordable

1,012k sf office

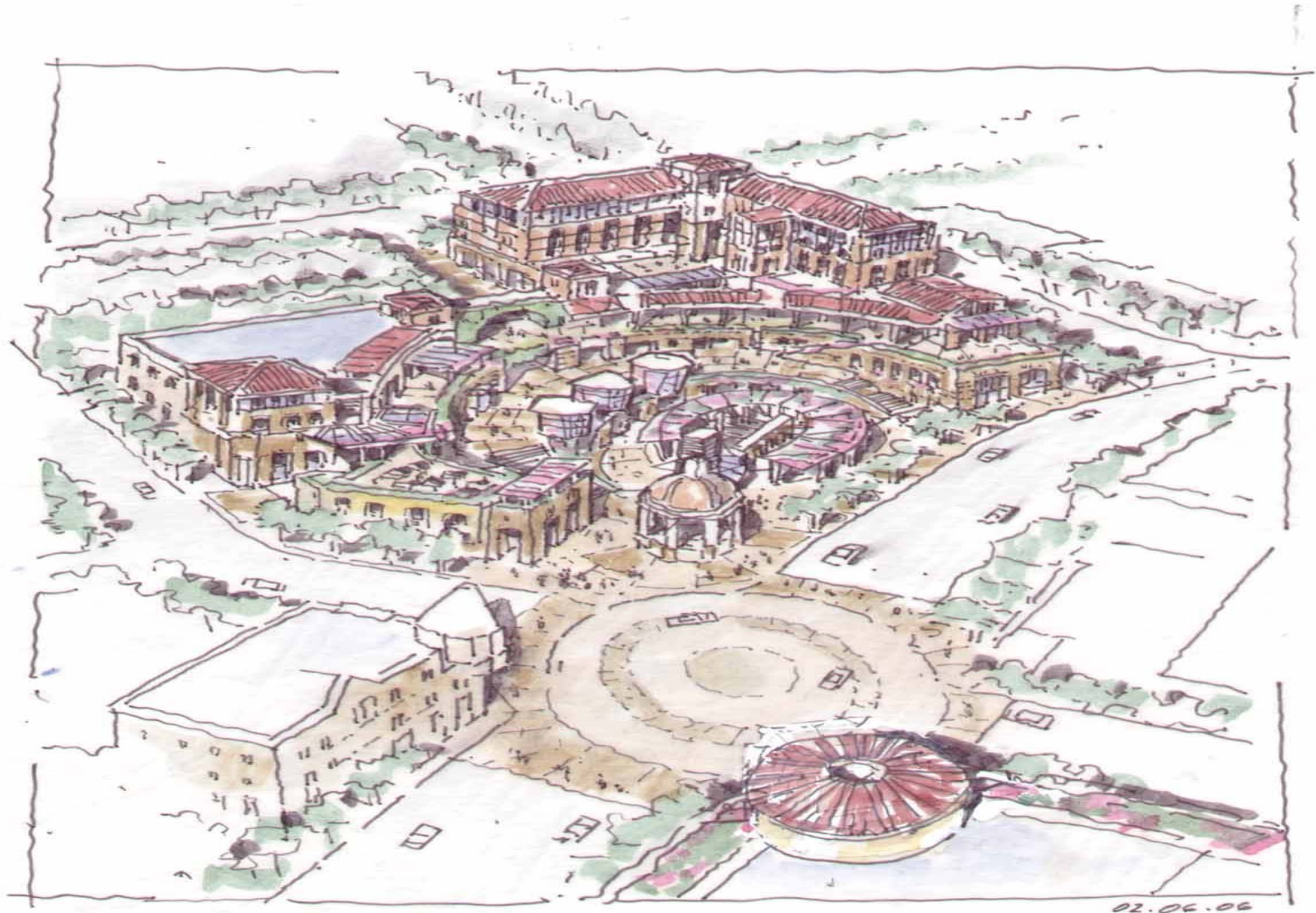
157k retail

35k community

# Lowe Enterprises – Perspective

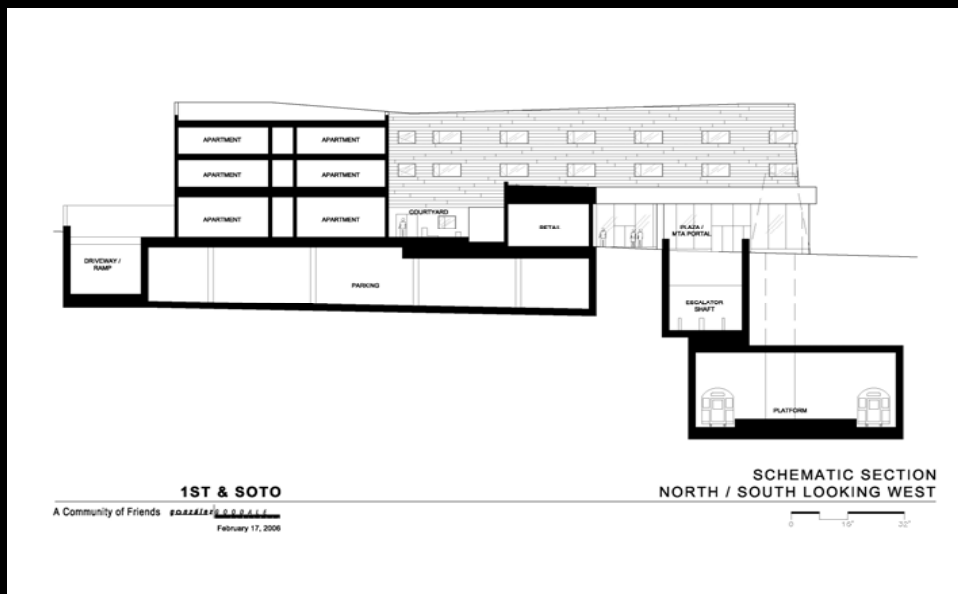


# 1<sup>st</sup> & Boyle



02.06.06

# 1<sup>st</sup> & Soto Proposed Use



- The project consists of 41 affordable housing units, a childcare facility and a community oriented retail center.
  - **Parcel 1:** First floor will include retail uses, 7 residential units, community room, conference room and Preschool. Both the second and third floor will have 17 additional apartment units (each floor) for a total 41 apartment units. The project includes 85 subterranean spaces. The affordable housing units will require public subsidy.
  - **Parcel 2:** Retail uses on the first floor and office space on the second floor with 10 parking spaces on this site.

# Taylor Yard

- The project will include:
  - 295 condominium units
  - 108 senior affordable apartment units
  - 68 affordable apartment units
  - Recreation building and pool
  - LEED certified

# Taylor Yard Parcel C – Conceptual Elevations for Parcel 5



Internal Street Elevation



San Fernando Road  
Elevation



LA River / Rail Elevation



# ***Strategies for Negotiated Procurements***

**Shawn L. Kildare**

**Program Executive (Acting), East Side Access  
Vice President, Project Controls, Quality, Safety  
& Environmental  
MTA Capital Construction**

# *Strategies for Negotiated Procurements*

## **Overview**

---

- Benefits of negotiated construction procurements.
- Where negotiated procurements work best.
- Disadvantages.
- Examples of negotiated procurements.

## *Strategies for Negotiated Procurements*

### **Benefits**

---

- Allows specific risks that the contractor raises to be shared.
- Allows specific “terms and conditions” items to be negotiated.
- Allows the contractor to suggest cost savings ideas that never come to light in a traditional “Design-bid-build” procurement strategy.

## *Strategies for Negotiated Procurements*

### **Where negotiated procurements work best**

---

- Owner knows what should be build.
- Owner has completed at least Preliminary Engineering:
  - Definitive design solution
  - Constructibility analysis
  - Detailed cost estimate and schedule
- Contractor will have complete control of work site.
- Minimal 3<sup>rd</sup> party influences.

## *Strategies for Negotiated Procurements*

### **Disadvantages**

---

- Lengthens the contract award process.
- Requires the owner to have a knowledgeable and experienced project management team to conduct the negotiations.
- Requires specific subject matter experts to be available to assist the project team during negotiations.
- May require additional engineering services.

## *Strategies for Negotiated Procurements*

### **Disadvantages (con't)**

---

- May require policy changes in some organizations:
  - To alter how construction contracts are procured,
  - To change standard contract terms and conditions.
- May require additional resources or procedures for overseeing the contractor in the field.
- Negotiations may not result in substantial cost savings especially if the number of bidders is limited or market conditions are tight.

# ***Strategies for Negotiated Procurements***

## ***South Ferry Terminal Project***

### ***Alternative Design Solution***

---

- Major Risk - The tunnel clearance envelope and the amount of existing tunnel reconstruction presented construction and cost risks.
- Actions taken
  - Cost reduction suggestions were solicited from the bidders as well as from Operating Departments
  - An innovative cost reduction solution through changing the track alignment was investigated and found feasible
  - These changes were transmitted to the bidders
- Result – The project budget was maintained and a major construction risk was eliminated.

# ***Strategies for Negotiated Procurements***

## **South Ferry Terminal Project**

### ***Project Schedule Mitigation***

---

- Major Risk - the Risk Analysis process identified possible schedule slippage due to long lead times for procuring Signal Equipment within the Station Finishes contract.
- Actions taken
  - Accelerated the Signal Design work
  - Removed the procurement of Signal Equipment from the Finishes contract
  - Bid the Signal Equipment early as a separate contract
- Result – maintained the project end date and achieved savings by eliminating General Contractor mark-ups.



# *Strategies for Negotiated Procurements*

## **East Side Access**

### *Risk Sharing*

---

- Major Risk – Only one bidder answered the initial bid solicitation (CM 009 - \$364M).
- Actions taken
  - Major outreach effort was undertaken to identify reasons for lack of contractor interest.
  - Conducted focused risk sharing sessions with contractors.
  - MTA contractual terms and conditions were changed.
- Result – Number of contractors increased with the successful bid coming in \$60M under the initial bidder who was \$30M over the engineer's estimate. Net savings was \$60M.

# ***Strategies for Negotiated Procurements***

## **East Side Access**

### ***Re-packaging – CM009***

---

- Major Risk – Contract Award was delayed 2 years (CM 009 - \$428M).
- Actions taken
  - Optimized construction phasing and the use of the TBM
  - Added \$100M scope from ensuing contracts.
- Result
  - Made the contract more attractive to bidders and saved 1 year of the 2 year delay
  - Project was estimated at \$482M and awarded at \$428M. Although this was \$64M more than the earlier \$384M low bid, the contractor is performing \$100M more work.

# ***Strategies for Negotiated Procurements***

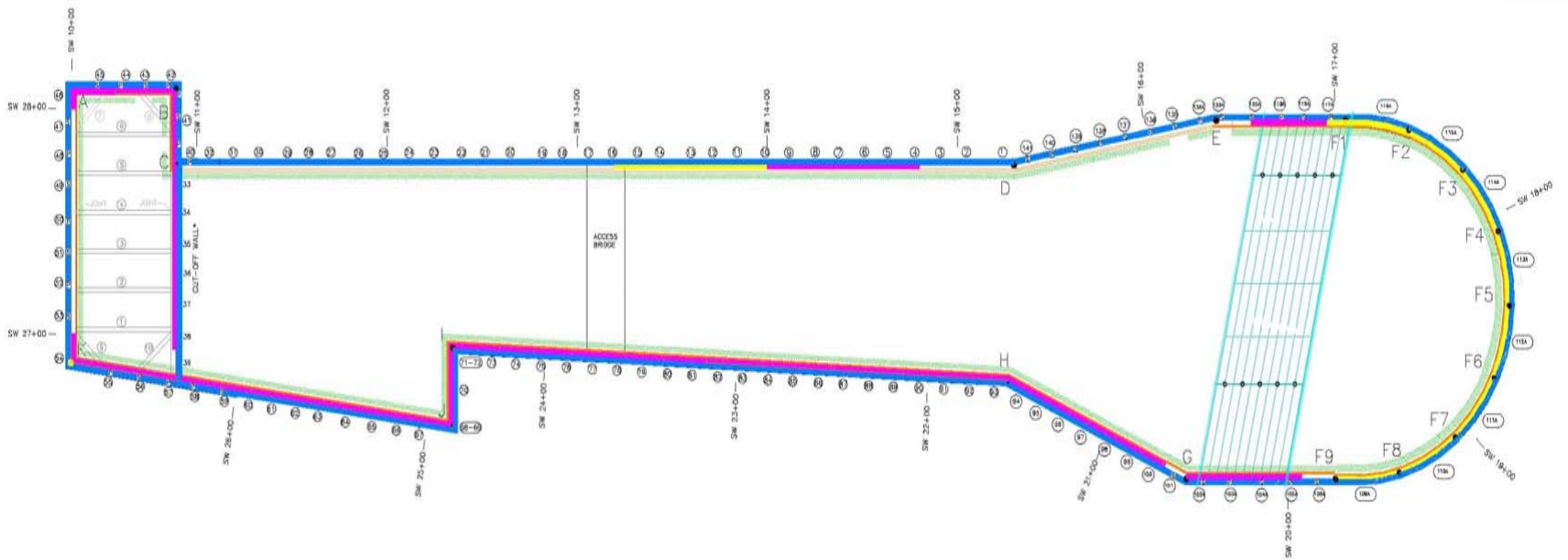
## **East Side Access**

### ***Re-packaging – CQ028***

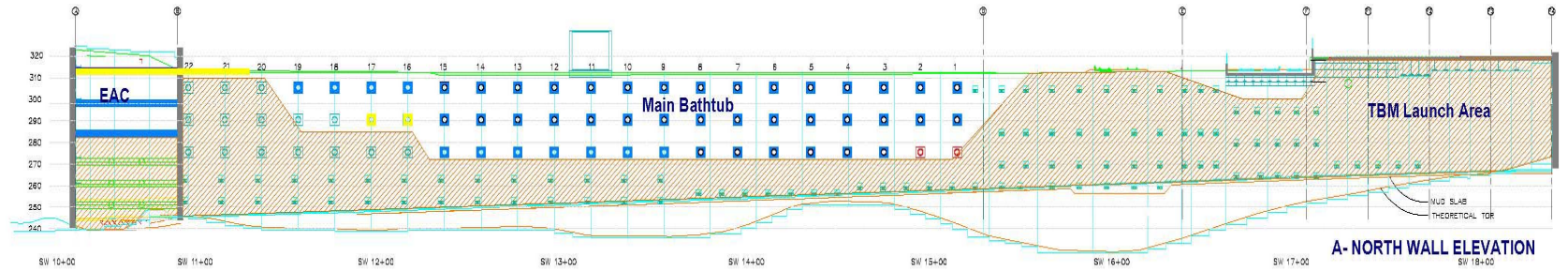
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- Major Risk – Recover schedule impact due to delay in approving project funding (CM028 - \$116M).
- Actions taken
  - Added \$60M extra scope.
  - Changed contract terms to relax a Prescriptive Design which permits the contractor to choose means and methods.
- Result
  - Recovered part of the schedule delay and saved funds.
  - Original low bid was \$96M. After re-packaging, the new low bid was \$116M.
  - Difference between low bids was \$23M but the contractor is performing an additional \$60M of scope.

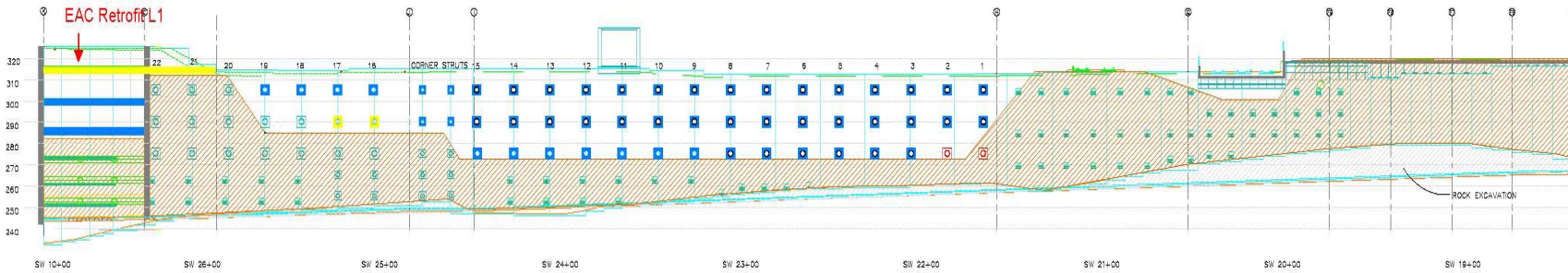
# East Side Access CQ028 – Excavation Footprint



# East Side Access CQ028 – Excavation Cross section



A- NORTH WALL ELEVATION



ROCK EXCAVATION

# ***Strategies for Negotiated Procurements***

## **East Side Access**

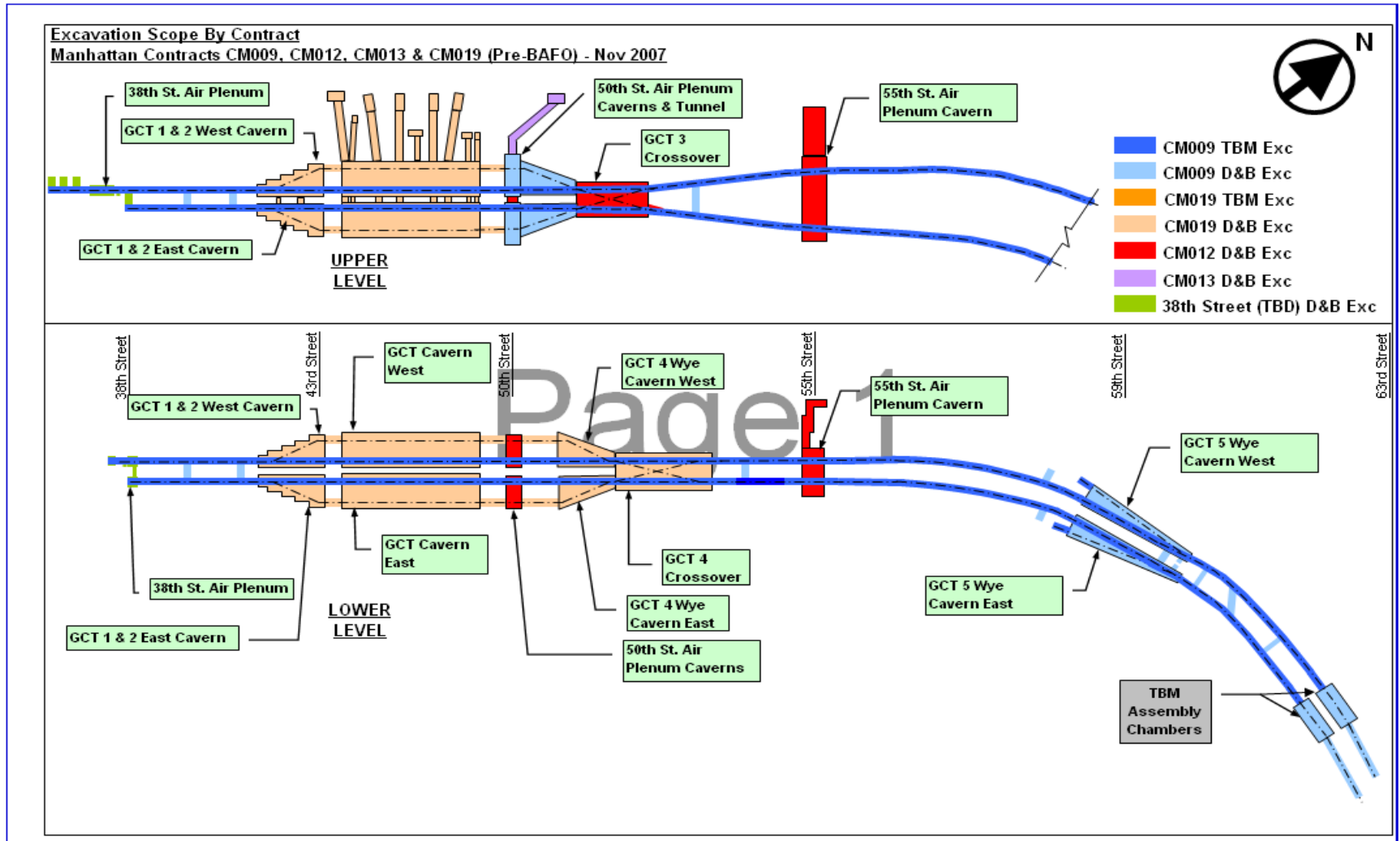
### ***Re-packaging – CM019***

---

- Major Risk – Initial cost proposal was significantly over budget.
- Actions taken
  - Removed nearly \$100M of scope which the contractor had priced significantly higher. Work was not core to their work and could be re-bid as separate contracts.
  - Added \$100M of work that complemented the work initially included without any schedule impacts.
- Result
  - Able to negotiate a contract that was within budget constraints.
  - Added scope so that the majority of excavation is now under contract.
  - The first two of the re-packaged elements have come in below budget.

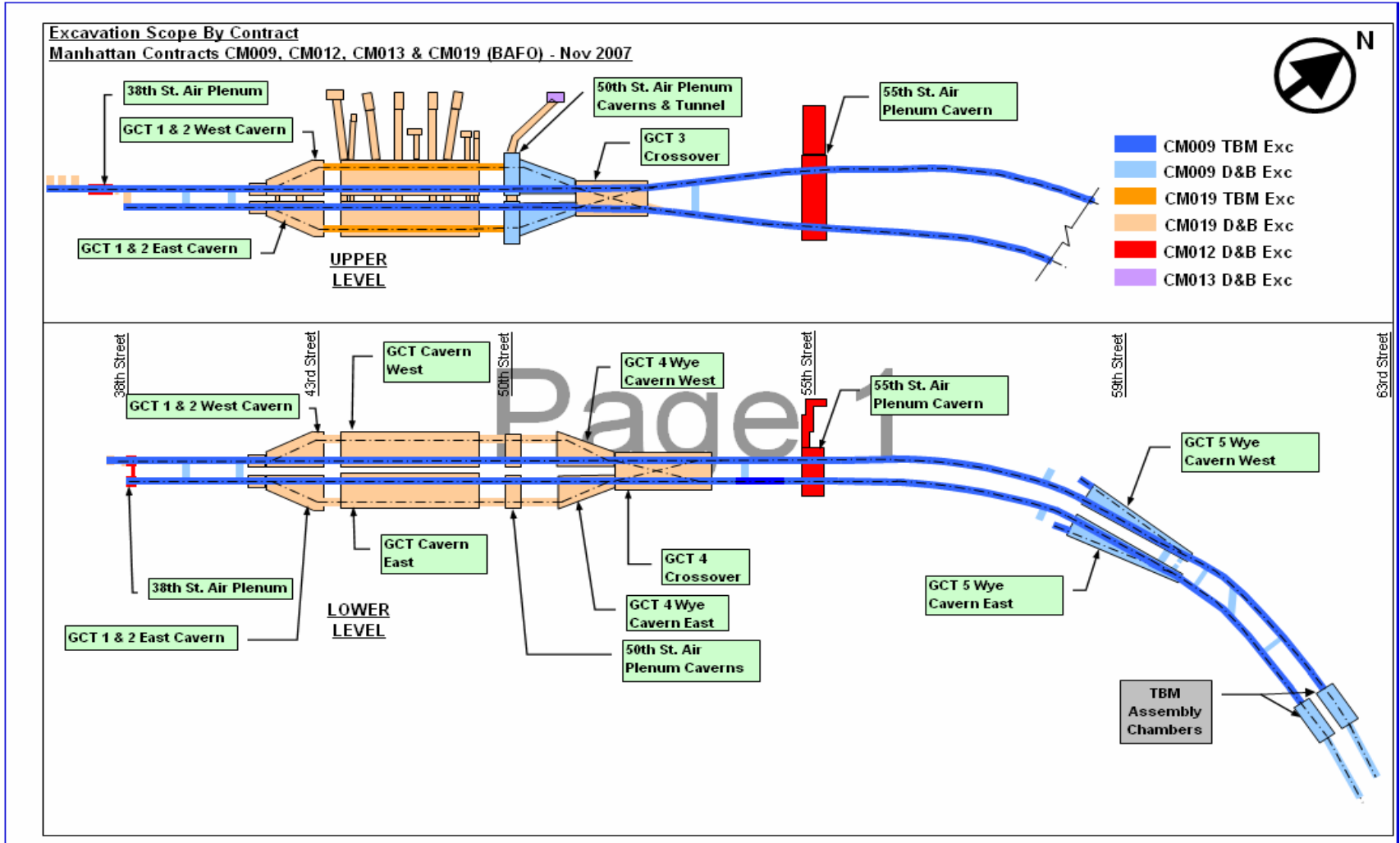
# East Side Access

## CM019 - Pre-BAFO Excavation Scope



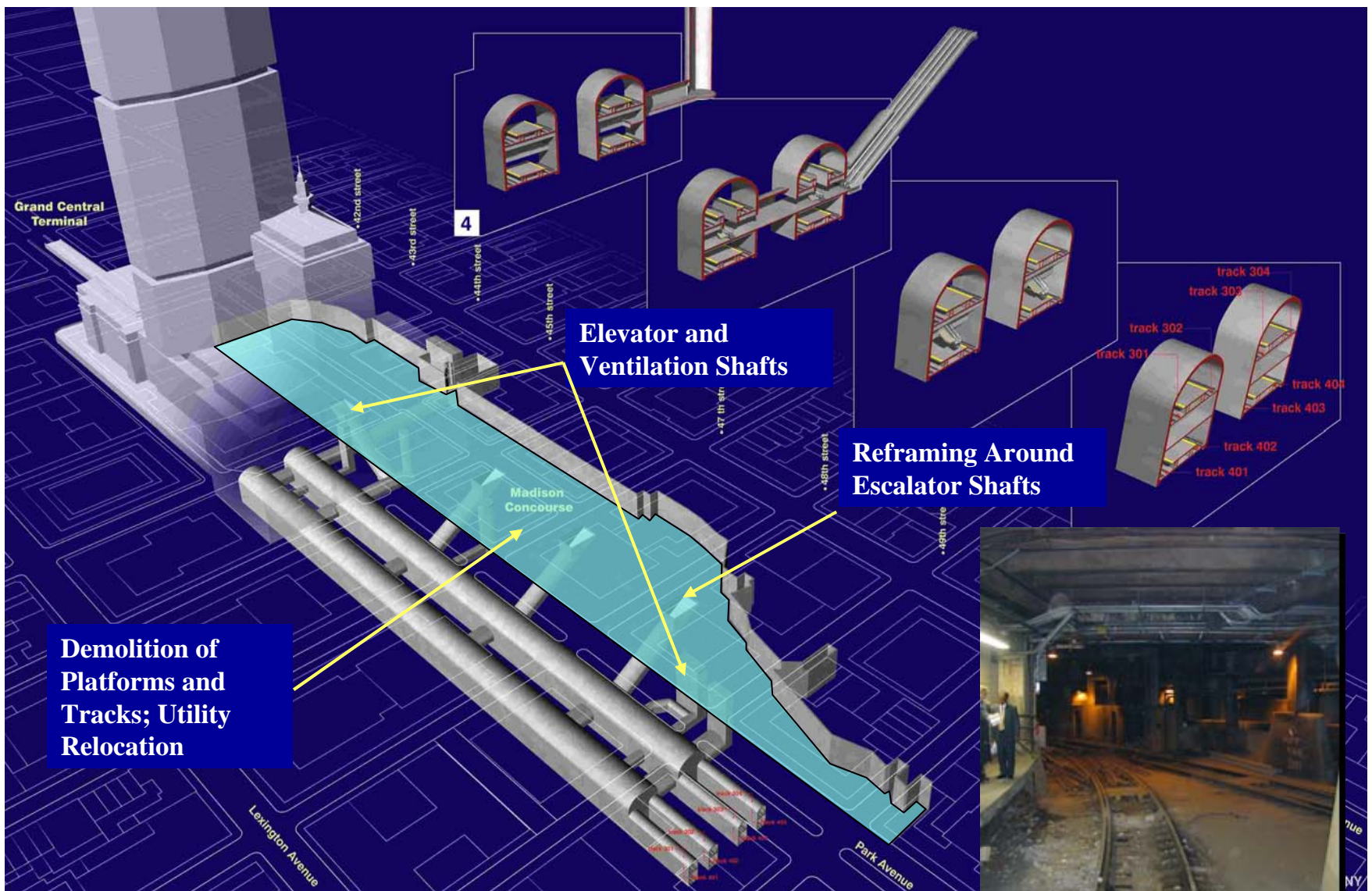
# East Side Access

## CM019 – Post BAFO Excavation Scope

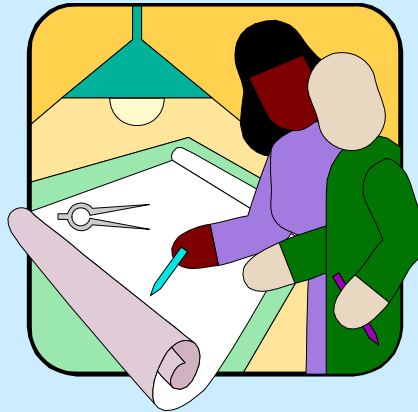




# East Side Access Manhattan Re-Packaging



# Quality Assurance in Project Design & Lessons Learned



*FTA Construction Roundtable*  
*April 2008*



## **MTA's track to Quality Improvement**

- **Early 80's-90's – MTA was an agency doing a few large projects for new rail systems (Metro and Light Rail)**
- **Early 90's – commuter rail system absorbed into MTA**
- **Present Day – MTA's has a few hundred capital projects that now include systems preservation, construction next to active rail lines, and expansion of commuter rail and bus services.**
- **Early 2000's – MTA created a separate QA/QC Division responsible for all Design and Construction and with direct report to Chief Engineer**
- **New Quality Assurance Program Plan (QAPP) issued in 2007 – replaced QA/QC Plan developed in early 1990's**

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**OFFICE OF ENGINEERING AND CONSTRUCTION**



## MTA's Quality Initiatives

- Quality Assurance Program Plan
- Quality Management Plan for Design Consultants
- Errors & Omissions Policy
- Facilities Engineering Design Procedures Manual
- Systems Engineering Design Procedures Manual
- Resident Engineer's Manual
- Inspector's Field Guide for Quality
- Commissioning Process and Guidelines
- QA/QC Training



# Quality Assurance Program Plan

- Follows FTA's QA/QC Guidelines consisting of 15 Elements
- Identifies requirements for development, implementation, maintenance, auditing, compliance review, and reporting of quality assurance activities
- All construction contracts, RFP's, and Purchase Orders, now include a requirement/specification for QA/QC

## QAPP – Design Reviews



- Determine if design criteria have been accurately expressed and verify constructability of design
- Determine if appropriate quality standards have been specified for intended use, and that parts, materials, equipment and processes specified are appropriate to the application
- Include any applicable means of verifying design such as modeling, independent design analysis, qualification testing, evaluation of historical data, and simulation
- Performed by personnel other than those who originated the design, but who have equal to or higher qualifications

## Quality Management Plan (QMP):

- Each design consultant required to develop and maintain a QMP specific to each assigned project.
- QMP establishes and maintains procedures to control and verify the design of projects ensuring design criteria and MTA or other pertinent requirements are met.
- Design control includes ensuring that design requirements are understood, design interfaces are coordinated, design verification activities are executed, and design changes are controlled



## Quality Management Plan (QMP):

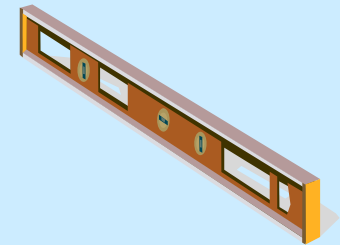
- Some initial resistance from consultant community and MTA Project Managers - was eventually overcome.
- This QMP requirement per design task is now specified in any new procurements of A/E contracts.
- MTA does not have to issue the NTP for a design task until the QMP is approved by the PM and QA/QC
- Has helped primes focus on managing their subconsultants more effectively - especially since Maryland has an aggressive MBE/DBE program

## Office of Engineering Manuals

- Facilities and Systems Design Manuals are used by design staff and provide techniques and standard procedures and processes for the management and control of design projects
- Resident Engineer's Manual is used by field staff to consistently administer construction contracts while the Inspector's Field Guide provides thorough checklists as a quick reference for inspection of many items
- Training is provided to all pertinent staff on each Manual and on each Quality Initiative

## Commissioning Process – Design Level

- Design Intent/Basis of Design
- Develop Commissioning Plan
- Develop Contract Requirements and Specifications relative to Commissioning
- Design Review



# Project Design Considerations

- Create an interdisciplinary team for each project that is involved at all review stages. (Eng., Constr., Ops, Safety, etc.)
- Each area has opportunity to be involved in the project from the start, assure their needs are being addressed and verify what is being proposed is feasible
- When feasible bring in Resident Engineer or CM Team to review documents prior to Ad
- Develop and use Lessons Learned for each project

## Quality Partnerships

- **MOE (Maintenance, Operations & Engineering) meetings to improve overall communications and efficiencies and develop a rapport.**
- **Develop partnerships with other offices within your agency that you do business with regularly, (Planning, Procurement, IT, Safety, Legal, etc.)**
- **Develop good rapport with local section of American Council of Engineering Companies (ACEC)**

## **Even with all these initiatives, we know that we will still have Quality issues...**

- **Develop an Errors and Omissions policy and procedures with some buy-in from the consultant community**
- **Develop and utilize a consultant rating system so if quality, performance or responsiveness slips or is unsatisfactory it is tracked.**
- **MTA has not tried to manage expectations of consultant key staff to stay with a firm – however, be prepared to give the firm a low consultant rating and poor reference on future contracts if necessary.**

## **Lessons Learned**

**MTA has been developing Lessons Learned from various completed projects to be able to:**

- **Pursue any corrective action of past mistakes**
- **Avoid making the same mistakes again and again**
- **Improve the Project quality in Design Phase**
- **Minimize the impacts in Construction Phase**
- **Improve the Project Delivery to the Customers**
- **Reduce Customer complaints**

## **Shortfalls of previous Lessons Learned**

**When a project is completed the Lessons Learned information gets discussed, but is potentially at risk of not reaching the Design Personnel as feedback due to:**

- **Coordination lacking between CM & Design Groups**
- **Loss of relevant Personnel to movement**
- **New Design Players on the team**
- **Lack of QA Oversight in closing the loop**
- **No consistency in storage or retrieval of information**

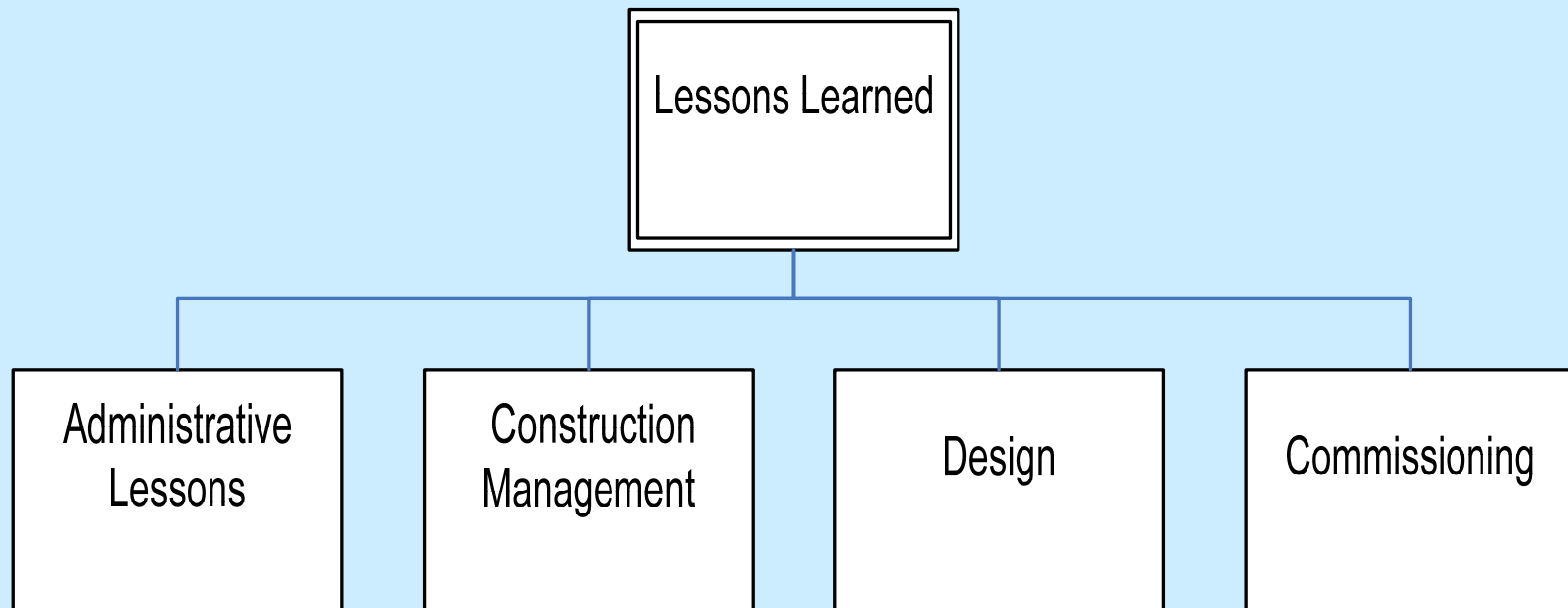


## **New approach for every ongoing Contract:**

**MTA is in the initial stages of developing a database generated through Lessons Learned from past and present completed projects**

- **Develop a Lesson Template for each Lesson Learned and input into new Database**
- **Require Project Managers, Designers, and QA staff to access the Database for any new projects assigned**
- **Database can be easily sorted by engineering discipline, type of project, etc.**

## Classify each Lesson into a Main Category



# Administrative Considerations

- **Clear Right-of-Way and all Permits obtained**
- **Bid Items and Estimated Quantities appropriate for project**
- **Schedule type appropriate for project**
- **Duration and milestones appropriate for project**
- **Liquidated damages amount sufficient to cover additional costs incurred**
- **Insurance requirements appropriate for project**

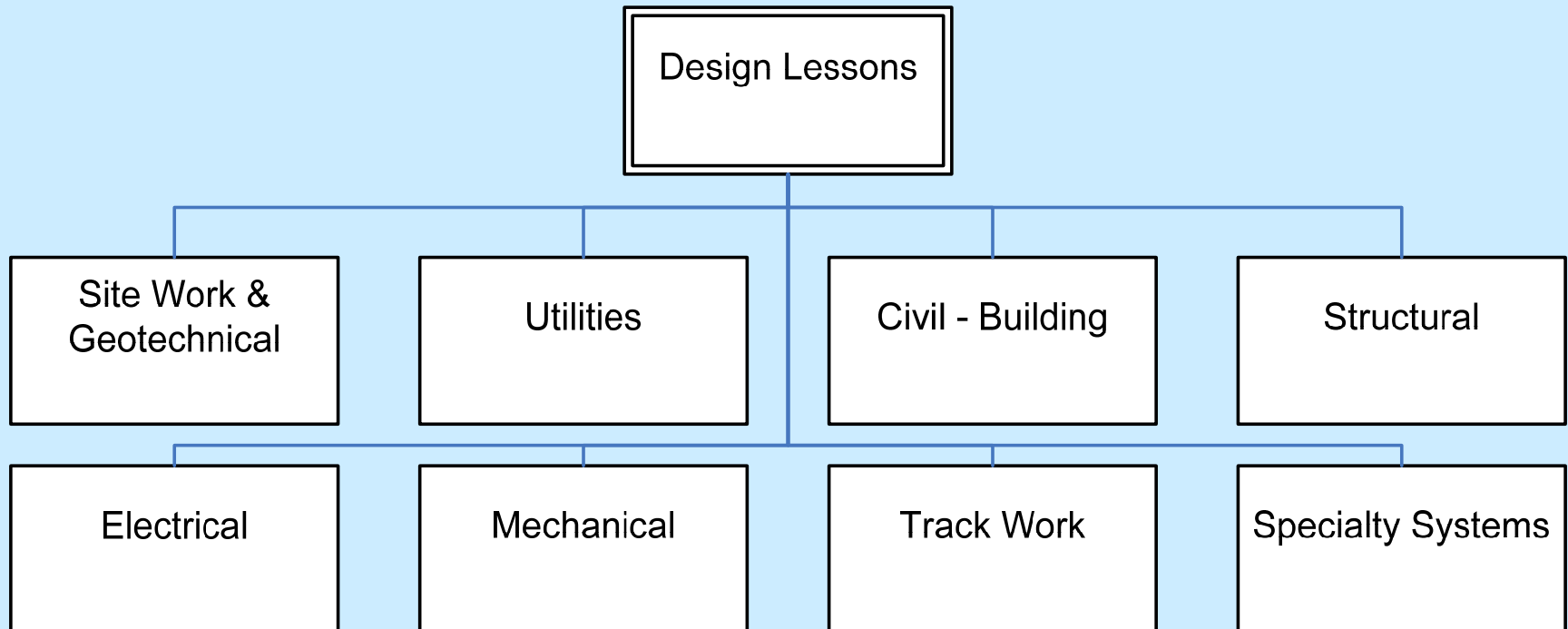
## Typical Design/Constructability Problem Areas:

- **Conflicts or lack of information in the documents or in the field**
- **Access to perform the work not identified or clearly spelt out**
- **Staging or sequencing not properly thought out or portrayed in documents, including maintaining service or traffic**
- **Methods or materials to construct the work are not feasible**

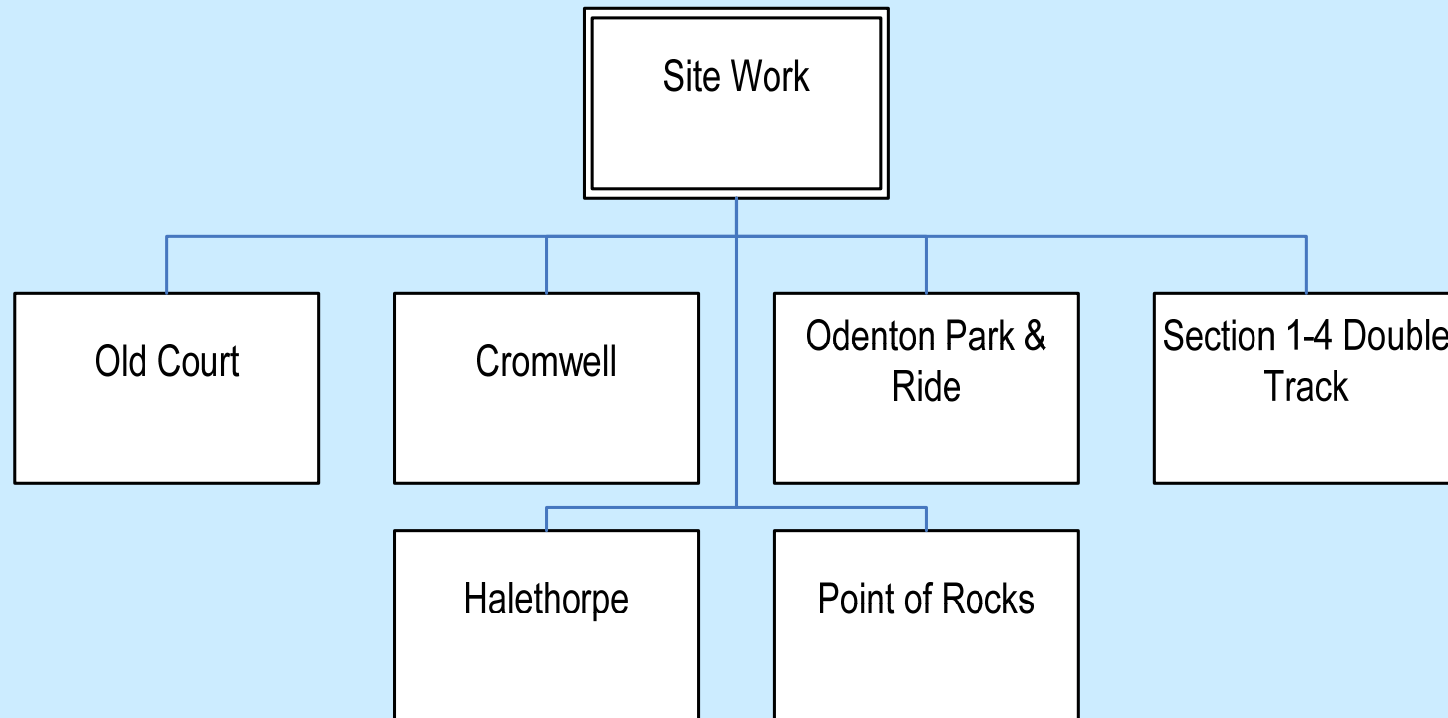
## Conflicts or Lack of Information

- Civil/systems interfaces are most common as are other conflicting proposed work areas indicated by multiple designers
- Insufficient utility investigation or unknown utilities, including our own!
- Insufficient geotechnical or environmental investigation or differing site conditions
- Ambiguities in the documents

## Facilities Design Lessons sub-categorized into:



**Engineering disciplines sub-categorized into projects:**



# MARYLAND TRANSIT ADMINISTRATION

## OFFICE OF ENGINEERING AND CONSTRUCTION



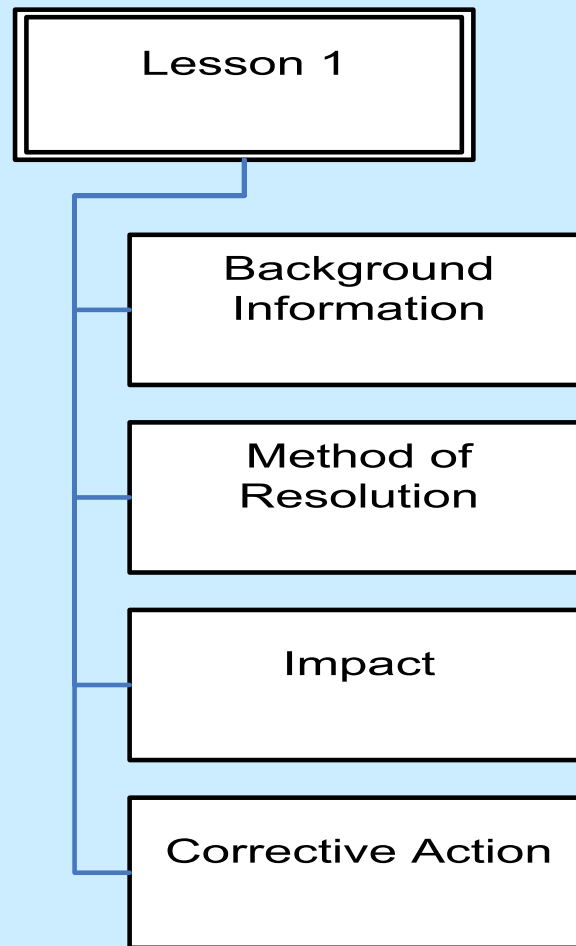


## Each Lesson Template consists of:

- Main and Sub-category
- Background Info – Finding of Fact (FOF)
- Method of Resolution
- Impact due to the Lesson – Time & Money
- Corrective action to be pursued & by whom

# MARYLAND TRANSIT ADMINISTRATION

## OFFICE OF ENGINEERING AND CONSTRUCTION



**QA personnel will review recently completed projects and ongoing contracts and shall:**

- **Review contract changes, RFIs & claims**
- **Create Lesson Learned Data Templates**
- **Maintain data in uniform template format**
- **Analyze the Lesson Learned data**
- **Validate the data with Design & CM groups**
- **Update the central database**

**MARYLAND TRANSIT ADMINISTRATION**  
**OFFICE OF ENGINEERING AND CONSTRUCTION**



*Thank You!*

*Questions?*

The logo features the word "DART" in a bold, dark blue, sans-serif font. The text is centered within a white, stylized arrow shape that points to the right. The arrow is composed of two overlapping geometric shapes: a larger white arrow pointing right and a smaller white arrow pointing left, creating a central white space where the text is located. The entire logo is set against a solid yellow background.

**DART**



**Go easy.**

**Twenty-Ninth Construction Roundtable**

**Myths or Facts  
Challenges for Successful  
Utility Relocations**

**Mr. Timothy H. McKay, P.E.**

**Senior Vice President**

**Dallas Area Rapid Transit**

**April 29, 2008**

# Utility Relocations

- ✓ Myth or Fact: It is less expensive to relocate a utility than design around it.
- ✓ Myth or Fact: No Subsurface Utility Engineering (SUE) is required if you plan to relocate the utility.
- ✓ Myth or Fact: Utility relocations can be done within a very short time frame and will not impact your project construction schedule.

# Challenge

## Decisions:

- Do you need to utilize Subsurface Utility Relocations (SUE)?
- What level of SUE should be used and when?
- Will the money spent for SUE during design save you money and time later?
- Is it more cost effective to relocate the utility or design around the utility?



# Three components of SUE

✓ Research



✓ Location  
(Survey and Designation)



✓ Data Management

**TEST HOLE DATA SHEET**

Half Associates  
10000 1/2 Mile Rd. N. Suite 100  
Charlotte, NC 28215  
Phone: 704.366.1111  
Fax: 704.366.1112  
www.halfassociates.com

Client: [Redacted]  
Project: [Redacted]  
Date: [Redacted]

Site Plan: [Diagram showing test hole locations and boundaries]

Legend:  
- 1. 100' RADIUS OF SEARCH  
- 2. 500' RADIUS OF SEARCH  
- 3. 1000' RADIUS OF SEARCH  
- 4. 1500' RADIUS OF SEARCH  
- 5. 2000' RADIUS OF SEARCH

Scale: 1" = 100'

Drawn by: [Redacted]  
Checked by: [Redacted]

Half Associates logo and seal.

# Four Quality Levels of SUE

- By knowing exactly where a utility is positioned in three dimensions, the designer can often make small adjustments in elevations or horizontal locations and avoid the need to relocate utilities.
- Additional information such as utility material, condition, size, soil contamination, and paving thickness also assists the designer and utility owner in their decisions.

# Tone Induced Into Utility



# Level A SUE



Concrete Core

# Challenge

Obtaining the cooperation of the utility companies.

Begin your discussions with the utility companies in design and include Upper Management for all parties in these discussions.

- ✓ Clarify who will pay for the relocations.
- ✓ If you are paying for the relocation, become familiar with the federal and state guidelines for utility relocation agreements.

# Challenge

- ✓ Agree to the process each party will use for getting the necessary approvals and signatures for these agreements within a timely manor.
- ✓ Agree on a schedule for the relocation that meets the needs of your project.

# Challenge

**C**ommunication,

**C**oordination and

**C**ooperation in the field during relocation of utilities and simultaneous construction of your project.





# Challenge

Who will handle the construction coordination for the utility company and the project construction contractor?

- If possible, get the utility company to designate specific construction crews to work on your project exclusively.





# Challenge

How to resolve disagreements during utility relocation and project construction.

- When conflicts or disagreements occur in the field, you have a system established and agreed to by all parties as to how the conflict will be resolved quickly.

# Summary

- Communication, Coordination and Cooperation
- Is your information based on facts or myths?



The logo features the word "DART" in a bold, dark blue, sans-serif font. The text is centered within a white, stylized arrow shape that points to the right. The arrow is composed of two overlapping triangular shapes, creating a sense of motion. The entire logo is set against a solid yellow background.

**DART**



**Go easy.**



FEDERAL TRANSIT ADMINISTRATION

TPM/Office of Engineering

## 29<sup>th</sup> FTA Transit Construction

# FTA Risk-Informed PM Oversight Status

Cleveland OH, April 27-29<sup>th</sup> 2008





# Agenda

- ❑ Background
- ❑ Evolution of Risk-Informed PM Oversight
- ❑ Where we are Today
- ❑ Program Basics
- ❑ Discussion about Contingency
- ❑ Risk-Informed Program Findings
- ❑ Where are we Going?

# Background

- Why does the FTA perform probabilistic risk assessment's?
  - Congressional pressure to bring in transit projects on-time & on-budget
  - Planning history of over-estimating benefits and under-estimating costs
  - Good stewards of federal tax dollars
- FTA has performed probabilistic risk assessment since 1994
  - “First generation” risk assessment began in Fall 2002 with Seattle’s Central Link LRT Project
  - “Second generation” risk assessment began with the Seattle University Link in 2006

# Evolution of Risk-Informed PM Oversight

- “First Generation” risk assessment was primarily a “bottoms-up” analysis
  - Generally, a work statement and set of drawings/specs are used to determine material quantities to perform each discrete task
  - From these quantities, unit costs, direct labor, equipment and overhead costs are derived
  - Develop “risk registers” for the project
  - This technique allows the level of detail to increase as the project moves towards construction

# Evolution of Risk-Informed PM Oversight (cont.)

- ❑ What happened to the “First Generation” risk assessment?
  - Out of 13 projects, only one project stayed within the 90<sup>th</sup> percentile forecast for budget and/or schedule
- ❑ What were some of the reasons that led to the poor estimations?
  - Contingency for these projects varied from 3-7% above the baseline cost estimate
  - Market conditions, solicitation packages, commodity escalation, and other “soft costs” were generally not analyzed in depth

# Where are we Today

- FTA's "Second Generation" risk assessment has evolved
  - It is now a risk business model (i.e., management tool versus an engineering estimate)
  - We can now forecast risk years in advance, versus 6-12 mos.
  - Risks should be assessed earlier in the project, and re-assessed later at key milestones
  - We now have a reliable mathematical tool to justify contingency amounts
  - It integrates risk management into the PMO contractor's oversight planning and execution
  - We want grantees to manage risk better

# Where are we Today (cont.)

## □ Benefits to the FTA Program

- It is tailored to each project given its complexity
- Risk tools also add value to the process by giving FTA an ability to integrate a wide range of information and related uncertainties into a manageable set of data
- It can identify discrepancies in project logic between cost, schedule and scope
- The grantee develops a Project Development Plan (PDP) and Project Execution Plan (PEP) based upon the risk assessment findings – these Plans become part of the PMP and are used to help manage the project

# Program Basics

- Risk assessment primarily performed during PE
  - Most risk (and least painful mitigation) takes place prior to the FFGA
    - ❖ After 10-20% construction, the only mitigation strategy available to a grantee is \$\$
  - The federal share for NS is fixed at Entry to FD – contingency must be agreed upon
  - The PDP is developed during PE; the PEP can be developed in either PE or FD
- Risk assessment during FD involves a “refresh” based upon new project information/data
  - This better utilizes both grantee and PMOC resources (i.e., less rigorous review)

# Program Basics (cont.)

## □ Risk Assessment Workshops in PE

- 4-5 Workshops, depending upon project scope and complexity
  - ❖ Transit Capacity Workshop
  - ❖ Project Delivery, Packaging, and Schedule Review Workshop
  - ❖ Project Scope and Cost Review Workshop
  - ❖ Project Implementation Plan Workshop
  - ❖ Project Execution Plan Workshop
- All the workshops together take place over a period of 4-6 months
- The risk assessment activities are in parallel to normal grantee project design activities
- Generally, risk assessment activities cannot begin until issuance of the ROD



# Discussion about Contingency

- How does the FTA/PMOC estimate contingency for a project?
  - Past project cost and schedule performance on a nation-wide basis by activity
  - Current project risk profile, given the complexity of the project
  - Estimated project cost and schedule
  - Range of the cost estimate

# Discussion about Contingency (cont.)

□ Findings from other organization's (approximation):

	<b>AACE</b>	<b>DOE</b>	<b>TCRP</b>	<b>FTA</b>
<b>Late AA</b>	<b>50%</b>	<b>40%</b>	<b>N/A</b>	<b>N/A</b>
<b>Entry PE</b>	<b>30%</b>	<b>30%</b>	<b>36%</b>	<b>30%</b>
<b>Entry FD</b>	<b>15%</b>	<b>20%</b>	<b>26%</b>	<b>20%</b>
<b>FFGA</b>	<b>10%</b>	<b>15%</b>	<b>N/A</b>	<b>15%</b>
<b>100% Bid</b>	<b>5%</b>	<b>10%</b>	<b>11%</b>	<b>10%</b>

Interpolated off of source documentation...

# Risk-Informed Program Findings

## □ So far, so good...

- “Second generation” risk assessment performed on 14 New Start projects – at this time, all 14 assessments within core accountability goals of 5% of the total project estimate
- That doesn’t mean that there aren’t challenges!
  - ❖ More work needs to be done with mitigation strategies for risk
  - ❖ Better mitigation means a higher probability for recovery of project schedule and/or budget
  - ❖ There is an understanding that adding sufficient contingency to a project may impact its cost-effectiveness

# Risk-Informed Program Findings (cont.)

- What are some of the lessons-learned to date?
  - Grantees must pay closer attention to escalation rates and YOE calculations than in recent years
  - Contract terms and conditions have had a strong influence on contractor pricing
  - In some cases, cost estimates are not linked to a WBS activity
  - Pricing may be adversely affected by lack of competition, perhaps resulting from procurement strategies and/or project delivery method
  - Reliability of structures to accommodate the mode of travel have only been assumed and not verified
  - Greatest risk to cost occurs during design and solicitation

# Where are we Going?

□ The “Second Generation” risk assessment is here to stay

- Both DOT and OIG support FTA’s efforts to assure a project with a solid scope having a quantified cost and schedule
- Longer use of this tool will provide the FTA with more data points, and thus lead to a higher confidence estimates
- Some grantees are already starting to perform their own “risk assessment” prior to the FTA
- The grantee and PMOC will actually use the PMP to manage the projects (i.e., the PMP won’t be a binder on a shelf)

## Where are we Going? (cont.)

- FTA is in the process of updating the following documents to further reflect these new improvements to its Risk-Informed PM Oversight Program:
  - The 1989 Final PMO Rule
  - Circular 5010, Grants Management Guidelines
  - Circular 5200, FFGA Guidelines
  - 2003 Project and Construction Management Guidelines

# Discussion

Questions?



# Chicago Transit Authority

## MANAGING CONSULTANTS PRESENTATION

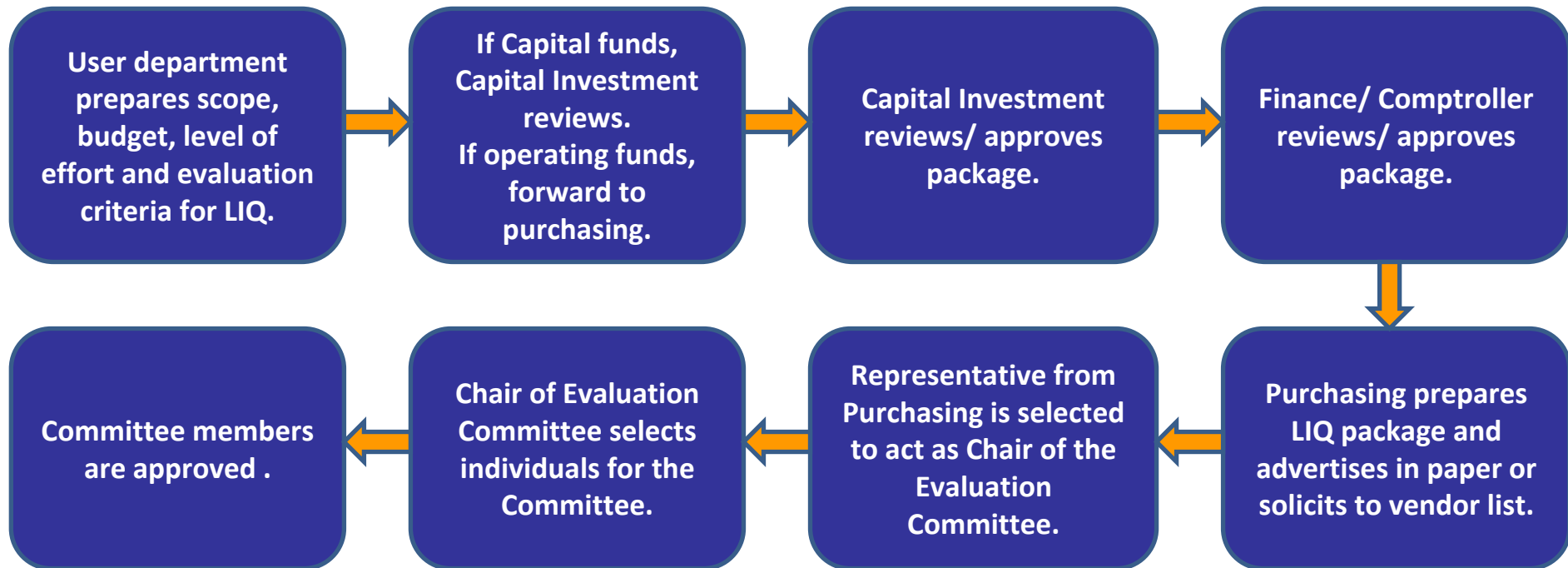
**TWENTY-NINTH TRANSIT CONSTRUCTION ROUNDTABLE**

**4/27 – 4/29/08 Cleveland, Ohio**

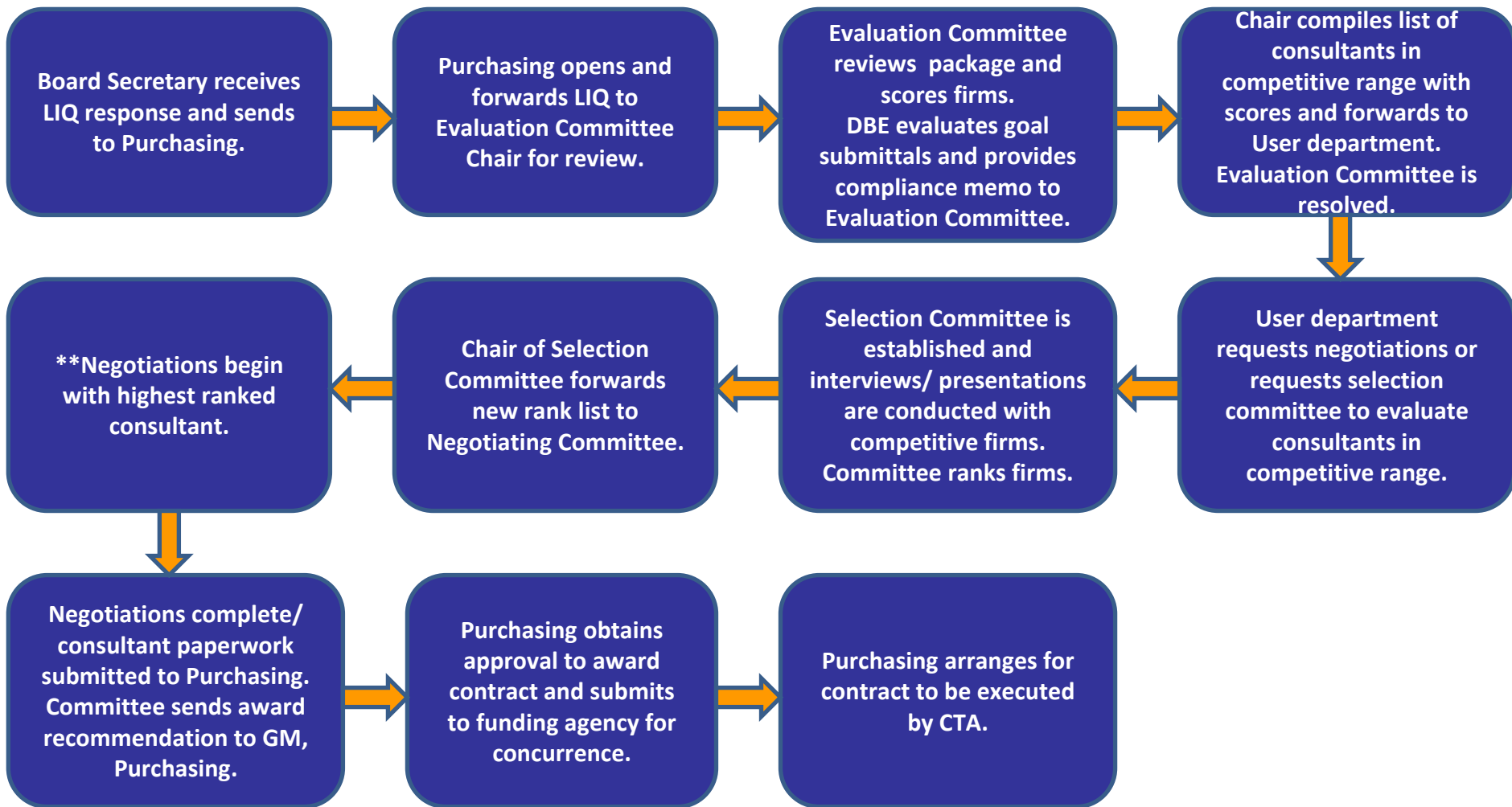
**Presented by: Glenn Zika**  
**Chief Engineer**



# Before LIQ Solicitation

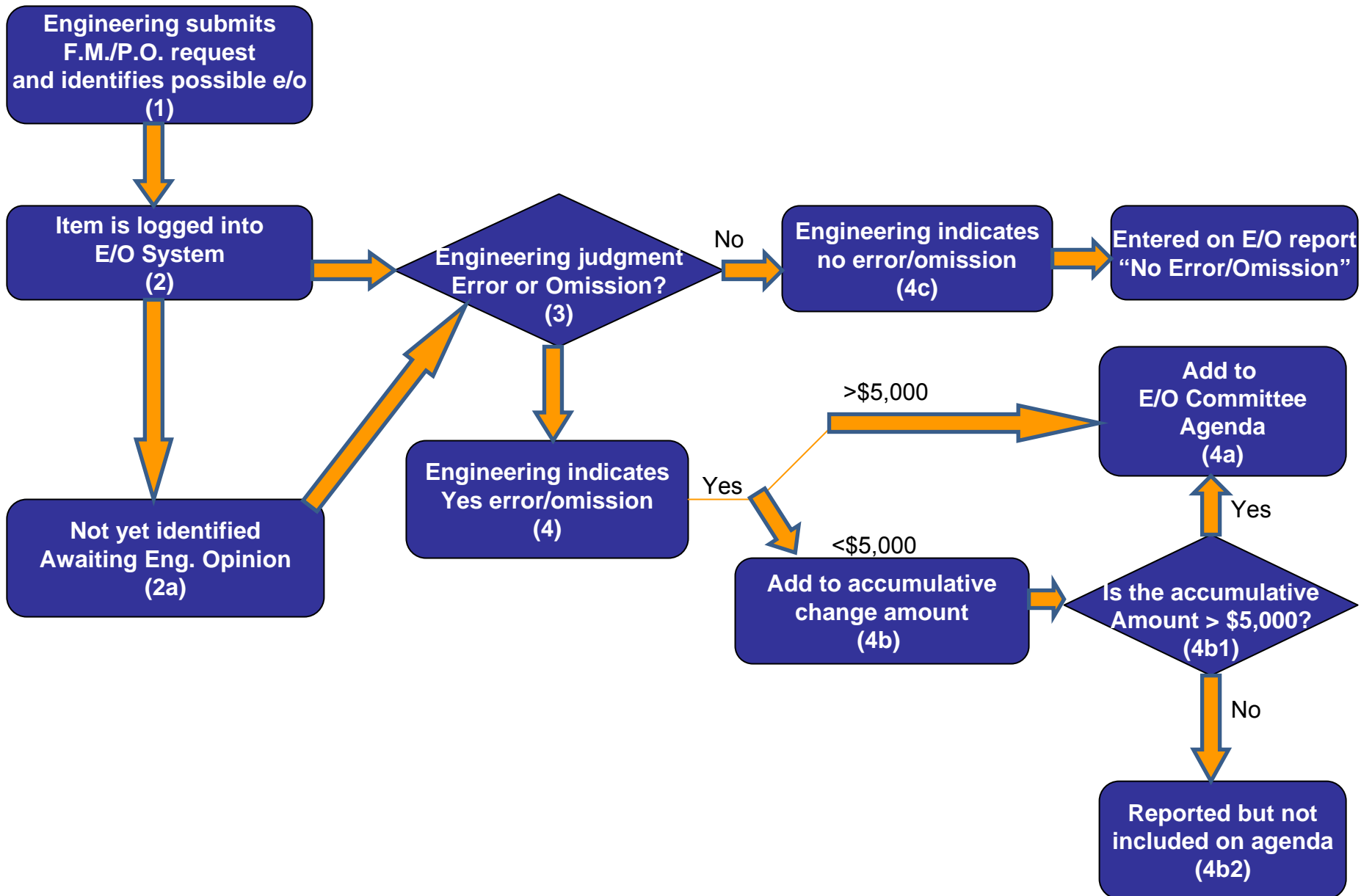


# LIQ Responses Received by Consulting Firms



**\*\*NOTE:** Negotiations are terminated and move down ranking list until a successful negotiation is reached. If no agreement is reached, the originating department must either revisit scope/budget and resubmit information to Purchasing or cancel the project.

# Error & Omission Analysis Procedure



# CONSULTANT PERFORMANCE EVALUATION

Consultant: \_\_\_\_\_ Evaluation: \_\_\_\_\_

Contract No: \_\_\_\_\_ Date: \_\_\_\_\_

Project: \_\_\_\_\_

Contract Start Date: \_\_\_\_\_ Completion Date: \_\_\_\_\_

Consultant Meeting Date: \_\_\_\_\_ Interim \_\_\_\_\_ Final \_\_\_\_\_

Consultant Principal-In-Charge: \_\_\_\_\_

Consultant Project Manager: \_\_\_\_\_

## Performance Rating Summary Overall Evaluation

Excellent      Above Average      Average      Below Average      Unacceptable  
A       B       C       D       E

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Would you recommend continuing selection of this firm?      Yes       No

Comments: \_\_\_\_\_  
\_\_\_\_\_